Report to

THE INTERNATIONAL JOINT COMMISSION

on

THE DIVISION AND USE MADE OF THE WATERS OF

# ST. MARY AND MILK RIVERS

by

L. B. LEOPOLD
representing United States

and

J. D. McLEOD
representing Canada

1963

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Please insert the attached revised errata sheet in your copy of the 1963 annual report to the International Joint Commission on the Division and Use made of the Waters of St. Mary and Milk Rivers.

REVISED ERRATA SHEET

Report to

THE INTERNATIONAL JOINT COMMISSION

on

THE DIVISION AND USE MADE OF THE WATERS OF

ST. MARY AND MILK RIVERS

- 1963 -

Please substitute this table for that appearing at the top of Page 2.

Summary of Water Delivered to
Downstream Country during 1963 Irrigation Season
St. Mary River.....April to October
Eastern Tributaries of Milk River...March to October

Quantities in acre-feet

| Stream | Natural Flow at International Boundary | % of Average | Canada Received | Deficit(-) Surplus(+) | United States Received | Deficit(-) Surplus(+) |
|---|---|---|---|---|---|---|
| St. Mary River | 510,700 | 87 (60 yrs.) | 316,900 | + 7,344 | | |
| Lodge Creek | 11,560 | 102 ( 2 yrs.) | | | 6,080 | + 299 |
| Battle Creek | 8,040 | 42 ( 6 yrs.) | | | 4,700 | + 674 |
| Frenchman River | 46,800 | 60 (23 yrs.) | | | 33,880 | +10,480 |

22 April 1964.

# E R R A T A

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| Frenchman River | 46,800 | 60 (23 yrs.) | | | | |

13 March 1964.

International Joint Commission,

Washington, D.C., and Ottawa, Ontario.

Gentlemen:

In compliance with the Provisions of Clause VIII (c) of your Order of the 4th October, 1921, directing the division of the waters of St. Mary and Milk Rivers between the United States and Canada, we are transmitting herewith a report on the operations during the irrigation season ended October 31, 1963.

Respectfully submitted,

Luna B. Leopold

L. B. Leopold
Accredited Officer of the United States.

J. D. McLeod
Accredited Officer of Her Majesty.

12 MAR [illegible], 1964.
(date)

## CONTENTS



## LIST OF TABLES

# INTRODUCTION

The field work incidental to the division and administration of the waters of the St. Mary and Milk Rivers in Alberta, Saskatchewan and Montana was conducted during the irrigation season of 1963 by representatives of the United States Geological Survey and the Water Resources Branch (Canada).

Dr. L. B. Leopold, Chief Hydraulic Engineer, United States Geological Survey, as accredited officer of the United States, was represented in the field by Mr. F. Stermitz, District Engineer, Helena, Montana. Mr. J. D. McLeod, Chief Engineer, Water Resources Branch, Department of Northern Affairs and National Resources, acting in the capacity of accredited officer of Her Majesty, was represented in the field by Mr. R. D. May, District Engineer, Calgary, Alberta.

This report has been prepared jointly by Mr. F. Stermitz and Mr. R. D. May.

The waters of the two rivers were divided between the two countries in accordance with the Order of the International Joint Commission dated at Ottawa, Canada, on the 4th day of October, 1921.

The hydrometric data upon which this report is based were collected and compiled jointly for 50 international stations. Data for another 12 stations in Canada and 6 stations in the United States were collected independently by the same engineers in their respective countries. The United States Bureau of Reclamation furnished data for 8 canal and 2 reservoir stations and the United States Bureau of Indian Affairs furnished data for one other canal station in Montana.

Summary data on the division of water during the 1963 irrigation season and on reservoir storage are given in the tables on page 2.

## Summary of Water Delivered to Downstream Country during 1963 Irrigation Season

St. Mary River ..... April to October
Eastern Tributaries of Milk River...March to October

Quantities in acre-feet

| Stream | Natural Flow at International Boundary | % of Average | Canada Received | Deficit (-) Surplus (+) | United States Received | Deficit (-) Surplus (+) |
|---|---|---|---|---|---|---|
| St. Mary River | 510,700 | 87 | 316,900 | + 7,344 | 6,080 | + 299 |
| Lodge Creek | 11,560 | 22 | | | 4,700 | + 674 |
| Battle Creek | 8,040 | 20 | | | 33,880 | +10,480 |
| Frenchman River | 46,800 | 55 | | | | |

## Summary of Reservoir Storage at end of 1962 and 1963 Irrigation Seasons

(Elevations in Feet and Capacities in Acre-Feet)

| Reservoir | Reservoir Elevation and Capacities (1963) | | | | Total Storage | |
|---|---|---|---|---|---|---|
| | Maximum | | Minimum | | 31 Oct. 62 | 31 Oct 63 |
| | Elev. | Cap. | Elev. | Cap. | | |
| Lake Sherburne | 4,788 | 66,200 | 4,726 | Negligible | 15,500 | 6,399 |
| St. Mary | 3,620 | 320,800 | 3,446 | Negligible | 227,400 | 192,500 |
| Fresno | 2,575 | 129,060 | 2,530 | 1,860 | 41,100 | 50,750 |
| Nelson | 2,223 | 85,450 | 2,200 | 18,650 | 53,050 | 37,020 |
| Middle Creek | 3,382 | 16,500 | 3,367 | Negligible | 0 | 462 |
| Altawan | 2,952.5 | 5,830 | 2,918 | Negligible | 1,910 | 2,660 |
| Cypress Lake | 3,168.5 | 110,300 | 3,153.5 | 28,050 | 46,970 | 40,100 |
| Eastend | 3,015 | 2,860 | 3,000 | Negligible | 540 | 67 |
| Val Marie West | 2,676.35 | 3,540 | 2,663 | Negligible | 1,860 | 77 |
| Val Marie | 2,639 | 16,560 | 2,617.5 | 829 | 9,620 | 5,910 |

NOTE: Elevation and Capacity figures given above corrected for 1963 to include results of re-surveys and construction changes.

# WATER SUPPLY

## St. Mary River

The total natural flow of the St. Mary River at the international boundary for the year 1 November 1962 to 31 October 1963 was 610,200 acre-feet. Of this total, 510,700 acre-feet occurred during the irrigation season 1 April to 31 October. The natural flow during the irrigation season was 87 per cent of 586,400 acre-feet, the average of the previous 60 years of record. 393,300 acre-feet was delivered to Canada during the year with 316,900 being delivered during the irrigation season. (See Table 1)

The forty-second annual international survey of snow conditions in the St. Mary River drainage basin was conducted on 30 April and 1 May, 1963. The survey provided advance information on the probable run-off during the irrigation season. The tabulated results of the forecasts and measured discharge at three locations are shown below.

| Location | Period of Correlation | Forecast of 1963 Run-off | | Measured Run-off | |
|---|---|---|---|---|---|
| | | Acre-feet | % of Average | Acre-feet | % of Average |
| Swiftcurrent Creek at Many Glacier | 1923-60 | 63,600 (May to July) | (1923-62) 93 | 70,530 (May to July) | (1923-62) 103 |
| Natural Flow Swiftcurrent Creek at Sherburne | 1922-60 | 106,000 (May to Sept.) | (1922-62) 93 | 111,600 (May to Sept.) | (1922-62) 98 |
| Natural Flow St. Mary River at International Boundary | 1922-60 | 463,000 (May to Sept.) | (1922-62) 92 | 473,200 (May to Sept.) | (1922-62) 94 |

## Milk River

The estimated natural flow of Milk River at its eastern crossing of the international boundary, during the period 1 March to 31 October 1963, was 28,000 acre-feet or 25 per cent of 113,000 acre-feet, the average of estimated natural flows of the previous 51 years of record.

Eastern Tributaries of Milk River

The total quantity of water delivered to the United States by the eastern tributaries of Milk River during the period, 1 March to 31 October 1963, was 66,710 acre-feet or 47 per cent of 140,900 acre-feet, the average of the previous 36 years. The quantities delivered to the United States by the various tributaries are listed in Table 4.

During the season, water was diverted from the eastern tributaries or stored in reservoirs in Canada as listed in Tables 9, 10 and 11. Measured diversions in Montana were 11,070 acre-feet as listed in Table 3.

The eleventh annual snow survey in the basins of the eastern tributaries of Milk River was conducted by the Water Resources Branch, Canada on 4 and 5 March, 1963. The average snow cover for 1963 was 4.8 inches compared to the eleven-year average of 7.9 inches. The average water content for 1963 was 1.5 inches compared to the eleven-year average of 2.1 inches.

## DIVISION OF WATER

### St. Mary River

The division of the waters of the St. Mary River was carried out in accordance with the Order of the International Joint Commission dated October 4, 1921.

The daily natural flow of the St. Mary River was determined in the following manner. Daily records were obtained at St. Mary Canal at St. Mary Crossing near Babb, St. Mary River at International Boundary, Lake Sherburne at Sherburne and an evaporation and precipitation station near Babb, Montana.

The natural flow of the St. Mary River at the international boundary was considered to be the sum of the quantities measured at St. Mary Canal at St. Mary Crossing near Babb, St. Mary River at International Boundary and addition of storage or subtraction of release corrected for evaporation at Lake Sherburne.

A one-day time lag was applied to stored and released quantities from Lake Sherburne to synchronize the flow with flow quantities at the international boundary.

The natural flow of the St. Mary River having been determined, the division of its waters was carried out in accordance with the above Order, as shown in Tables 5 to 8 inclusive.

During the irrigation season, 1 April to 31 October, field engineers of both countries made frequent computations of the daily natural flow of the river and each country's share thereof, in order that any appropriation by the United States in excess of their share could be adjusted by a subsequent delivery to Canada of an equivalent amount at the earliest opportunity.

Regular interim reports on the progress of the division of the natural flow at the international boundary were made to interested agencies throughout the irrigation season.

During the non-irrigation season, 1 November 1962 to 31 March 1963, no interim reports were made as the only United States use during this period was storage in Lake Sherburne where the contributing drainage area is about 14 per cent of the total area of the St. Mary River drainage basin in the United States.

Storage in Lake Sherburne was 15,500 acre-feet on 31 October 1962 and had increased to 38,470 acre-feet by 31 March 1963 and to 66,130 acre-feet by 15 July 1963. On 31 October 1963 the storage was 6,400 acre-feet.

The St. Mary Canal was operated between 3 April and 23 September and water was delivered to the North Milk River from 4 April to 1 October.

Seepage from the canal between the point of diversion and the crossing of the St. Mary River is assumed to return to the river and eventually become available to Canada. The discharge of 224,200 acre-feet which passed the gauging station on the St. Mary Canal at St. Mary Crossing near Babb between 3 April and 23 September was considered to be the quantity diverted from the St. Mary River by the United States. A total of 219,200 acre-feet was delivered to the North Milk River at Hudson Bay Divide during the season, from where it was conveyed to irrigation projects in Montana via the Milk River.

Canada diverted 805,000 acre-feet of water from the St. Mary River Reservoir in 1963 as measured at the Canadian St. Mary Canal and Magrath Irrigation District Canal gauging stations near Spring Coulee. (See Table 1)

Milk River

No division of the flow of Milk River at Eastern Crossing was made in 1963. Except for a few small unmeasured diversions above the eastern crossing of the international boundary, the entire natural flow of the Milk River at that point was delivered to the United States.

The United States Geological Survey began streamflow record collection in 1961 on the South Fork Milk River near Babb to assist in studying the utilization of waters in the Milk River Basin within the Blackfeet Indian Reservation. This station was designated as international in 1963.

Some concern has been expressed in Canada as the result of prolonged periods of inadequate supply for stockwatering along the Milk River above the mouth of the North Milk River.

No flow was recorded from the 7 August to 31 October, with the exception of small flows on the 25 and 26 August, in the Milk River at the western crossing of the international boundary.

A report to the International Joint Commission has been prepared by the United States Geological Survey on the Utilization of Waters in the Milk River Basin within the Blackfeet Reservation, Montana.

Stream gauging stations within the area were operated jointly by the United States and Canada during the 1963 season.

Eastern Tributaries of Milk River

Minor Diversions: Estimates for a number of small diversions from the eastern tributaries of Milk River in Saskatchewan were provided by the Water Rights Division of the Province of Saskatchewan and are based on reports from the individual licensed irrigators. These estimates are not used in the Lodge Creek division computations in Table 2, except as an adjustment to the totals for the season. The estimated quantities reported to date for 1963 are detailed in the Appendix to this report.

Lodge Creek: The computed natural flow of Lodge Creek at the international boundary for the period 1 March to 31 October 1963 was 11,560 acre-feet of which each country was entitled to fifty percent (5,780). The details of this division are summarized in Table 2, and shown in Table 9.

A total of 6,080 acre-feet was recorded at the international boundary, which is 105 per cent of the United States share.

Battle Creek: The computed natural flow of Battle Creek at the international boundary for the period 1 March to 31 October 1963 was 8,040 acre-feet of which each country was entitled to fifty per cent (4,020). The details of this division are summarized in Table 2, and shown in Table 10.

A total of 4,700 acre-feet was recorded at the international boundary, which is 117 per cent of the United States share.

Miscellaneous measurements were made on Battle Creek during the season. It is hoped that a further and more comprehensive series of measurements in future years may provide some definite figures for computing channel losses and return flow.

Frenchman River: The computed natural flow of the Frenchman River at the international boundary for the period 1 March to 31 October 1963 was 46,800 acre-feet of which each country was entitled to fifty per cent (23,400). The details of this division are summarized in Table 2 and shown in Table 11.

A total of 33,880 acre-feet was recorded at the international boundary which is 145 per cent of the United States share.

The natural flow of the Frenchman River at the international boundary was computed using a nine-day time lag for Cypress Lake storage and diversion, seven-day time lag for Eastend Reservoir storage and diversion, and a three-day time lag for Val Marie storage and diversion, to synchronize the flow with flow quantities at the international boundary.

During 1963 a channel loss study was implemented on the Frenchman River. Measurements were taken at approximately thirty different stations on the Frenchman River and its tributaries during June, September and October. Due to wet weather the results of the three series of measurements carried out this year were inconclusive, but it was felt that several more series during 1964 and in future years may help in computing channel losses at low flows.

## Appendix

An Appendix, submitted with this report under separate cover, contains the result of discharge measurements, summary of monthly discharge and the daily gauge height and discharge data for 60 gauging stations operated during 1963 in the St. Mary and Milk River drainage basins. Details of the Canadian minor diversions, as grouped in Table 2 of the report, are included.

Table 1
Page 1

Summary of Division of St. Mary River
and Diversion to Milk River
1963
Quantities in acre-feet

| Month | St. Mary River at Int. Boundary | | | | Excess Received by Canada | Storage Lake Sherburne | Total Available for Diversion | St. Mary Canal | Milk River at Eastern Crossing* |
|---|---|---|---|---|---|---|---|---|---|
| | Recorded Flow | Natural Flow | United States Share | Canadian Share | | | | | |
| April | 15,717 | 20,692 | 5,219 | 15,473 | +244 | -29,539t | 34,758 | 34,514 | 28,870 |
| May | 64,574 | 108,236 | 43,866 | 64,370 | +204 | +5,022 | 38,844 | 38,640 | 38,820 |
| June | 115,353 | 201,753 | 90,956 | 110,797 | +4,556 | +44,467 | 46,489 | 41,933 | 45,230 |
| July | 62,920 | 105,045 | 42,266 | 62,779 | +141 | +161 | 42,105 | 41,964 | 43,510 |
| Aug. | 25,505 | 34,100 | 8,582 | 25,517 | -12 | -33,765t | 42,347 | 42,359 | 39,020 |
| Sept. | 19,226 | 24,105 | 6,030 | 18,075 | +1,150 | -19,924t | 25,954 | 24,803 | 31,330 |
| Oct. | 13,611 | 16,725 | 4,175 | 12,549 | +1,061 | + 3,114 | 1,061 | 0 | 1,700 |
| Total Irrig. Season | 316,906 | 510,656 | 201,094 | 309,560 | +7,344 | -30,464t | 231,558 | 224,213 | 228,480 |
| For Year Nov. to Oct. | 393,333 | 610,165 | 250,849 | 359,314 | | | | | |

t Negative sign indicates a release from Lake Sherburne.

* Represents natural flow of Milk River and diversion from St. Mary River Basin.

Lake Sherburne quantities are corrected for evaporation.

Storage in Lake Sherburne on March 31 = 38,470 acre-feet.
October 31 = 6,399 acre-feet.

Storage in Fresno Reservoir on March 31 = 49,050 acre-feet.
October 31 = 50,750 acre-feet.

# DIVISION OF FLOW OF ST. MARY RIVER
## 1963

### Water Available to Canada at Spring Coulee from St. Mary River

**Quantities in acre-feet**

| Month | St. Mary River Int. Boundary | Rolph Creek Kimball | Lee Creek Cardston | Total Available at Spring Coulee |
|---|---|---|---|---|
| April | 15,717 | 92 | 1,680 | 17,489 |
| May | 64,574 | 16 | 4,160 | 68,750 |
| June | 115,353 | 276 | 7,600 | 123,229 |
| July | 62,920 | 179 | 3,330 | 66,429 |
| August | 25,505 | 115 | 846 | 26,466 |
| September | 19,226 | 157 | 587 | 19,970 |
| October | 13,611 | 94 | 577 | 14,282 |
| Total | 316,906 | 929 | 18,780 | 336,615 |

### DISPOSITION OF WATER AVAILABLE TO CANADA

### Water Used in St. Mary and Milk Rivers Development

**Quantities in acre-feet**

| Month | Canada's Share Natural Flow: Int. Boundary | Canadian St. Mary Canal: Spring Coulee | Magrath I.D. Canal: Spring Coulee | Total Diverted to S.M.R.D. |
|---|---|---|---|---|
| April | 15,473 | 43,820 | 284 | 59,577 |
| May | 64,370 | 108,500 | 2,850 | 175,720 |
| June | 110,797 | 117,500 | 2,820 | 231,117 |
| July | 62,779 | 66,090 | 1,640 | 130,509 |
| August | 25,517 | 72,420 | 2,430 | 100,367 |
| September | 18,075 | 53,210 | 887 | 72,172 |
| October | 12,549 | 21,030 | 1,930 | 35,509 |
| Total | 309,560 | 482,570 | 12,841 | 804,971 |

Storage in St. Mary Reservoir March 31, Elev. 3615.11 = 277,100 acre-feet
October 31, Elev. 3602.39 = 192,500 acre-feet

Table 1
Page 3

MAJOR DIVERSIONS FROM MILK RIVER
IN THE UNITED STATES

1963

Quantities in acre-feet

| Month | Fort Belknap Canal | Paradise Canal | Harlem Canal | Harlem No. 2 | Agency Canal | Dodson North | Dodson South | Vandalia Canal | Wiota Pumping Plant |
|---|---|---|---|---|---|---|---|---|---|
| March | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| April | 1,540 | 1,310 | 0 | 198 | 595 | 0 | 0 | 0 | 0 |
| May | 18,320 | 8,350 | 2,260 | 1,240 | 7,250 | 3,410 | 12,750 | 4,110 | 972 |
| June | 15,860 | 6.300 | 6,150 | 1,130 | 7,290 | 4,030 | 17,780 | 3,160 | 704 |
| July | 17,460 | 7,120 | 3,010 | 791 | 4,740 | 7,200 | 15,920 | 5,430 | 1,250 |
| Aug. | 18,490 | 8,630 | 6,660 | 1,170 | 4,070 | 6,030 | 12,790 | 9,940 | 1,300 |
| Sept. | 9,930 | 4,090 | 2,140 | 791 | 2,470 | 2,360 | 11,650 | 8,290 | 65 |
| Oct. | 4,170 | 0 | 1,510 | 0 | 0 | 714 | 5,170 | 1,830 | 2,140 |
| Nov. | 545 | 0 | 198 | 0 | 0 | 0 | 2,980 | 0 | 456 |
| Total | 86,315 | 35,800 | 21,928 | 5,320 | 26,415 | 23,744 | 79,040 | 32,760 | 6,887 |

Total of Major Diversions from Milk River
in the United States = 318,200

Storage in Nelson Reservoir on March 31, 42,510
on October 31, 37,020

Table 2
Page 1

SUMMARY OF NATURAL FLOW AND DIVISION OF
EASTERN TRIBUTARIES OF MILK RIVER IN CANADA

Lodge Creek at International Boundary

1963

Quantities in cfs-days

| Period 1 to 30 | Storage Middle Creek Reservoir and Bedford Slough | Storage Spangler Project | Lodge Creek at International Boundary | Natural Run-off from Project Areas | Natural Flow Lodge Creek at International Boundary | United States | |
|---|---|---|---|---|---|---|---|
| | | | | | | Share | Received in Excess |
| March | +10 | +639 | 324 | 27 | 1,000 | 500 | -176 |
| April | +67 | +173 | 729 | 80 | 1,049 | 524 | +205 |
| May | -15 | + 3 | 18 | 3 | 15 | 8 | + 10 |
| June | -17 | 0 | 0 | 0 | 0 | 0 | 0 |
| July | +77 | +1,432 | 1,889 | 292 | 3,690 | 1,845 | + 44 |
| Aug. | 0 | -137 | 104 | 0 | 0 | 0 | +104 |
| Sept. | -10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct. | -17 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | +95 | +2,110 | 3,064 | 402 | 5,754 | 2,877 | +187 |
| Acre-feet | +188 | +4,185 | 6,077 | 797 | 11,413 | 5,706 | +371 |
| Estimated acre-feet total of minor diversions detailed in the Appendix to this report | | | | | 143 | 72 | -72 |
| | | | | | 11,556 | 5,778 | 299 |

Table 2
Page 2

SUMMARY OF NATURAL FLOW AND DIVISION OF
EASTERN TRIBUTARIES OF MILK RIVER IN CANADA

Battle Creek at International Boundary

1963

Quantities in cfs-days

| Period 5 to 4 | Net Depletion in Canada | Battle Creek at International Boundary | Apparent Natural Flow of Battle Creek at International Boundary | Adjustment for Minor Diversions in Canada | Net Depletion at Reesor Lake and Adams Lake | Battle Creek at International Boundary | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Natural Flow | United States Share | Received in Excess |
| 23 Feb. to 4 Mar. | 0 | 84 | 84 | 10 | 0 | 94 | 47 | 37 |
| 5 Mar. to 4 Apr. | +627 | 368 | 995 | 120 | 0 | 1,115 | 557 | -189 |
| 5 Apr. to 4 May | +96 | 993 | 1,089 | 133 | +133 | 1,355 | 678 | 315 |
| 5 May to 4 June | +23 | 156 | 179 | 22 | -57 | 144 | 72 | 84 |
| 5 June to 4 July | -78 | 278 | 200 | 25 | 0 | 225 | 112 | 166 |
| 5 July to 4 Aug. | +508 | 489 | 997 | 122 | 0 | 1,119 | 560 | -71 |
| 5 Aug. to 4 Sept. | -1 | 0 | 3 | 0 | 0 | 3 | 2 | -2 |
| 5 Sept. to 4 Oct. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 Oct. to 31 Oct. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | +1,175 | 2,368 | 3,547 | 432 | +76 | 4,055 | 2,028 | 340 |
| Acre-feet | +2,331 | 4,697 | 7,035 | 857 * | +151 | 8,043 | 4,022 | 674 |

* - 12.18% of the apparent natural flow was used for the adjustments for minor diversions in Canada. This figure is based on the 857 estimated acre-feet total of minor diversions detailed in the Appendix to this report.

Table 2
Page 3

SUMMARY OF NATURAL FLOW AND DIVISION OF
EASTERN TRIBUTARIES OF MILK RIVER IN CANADA

Frenchman River at International Boundary

1963

Quantities in cfs-days

| Period 1 to 31 | Depletion in Canada | Frenchman River at Int. Boundary | | Adjustments for Minor Diversions in Canada | Frenchman River at International Boundary | | |
|---|---|---|---|---|---|---|---|
| | | Recorded Flow | Apparent Natural Flow | | Natural Flow | U.S. Share | Received in Excess |
| March | +1,976 | 5,891 | 7,867 | 332 | 8,199 | 4,099 | 1,792 |
| April | +2,172 | 4,729 | 6,901 | 291 | 7,192 | 3,596 | 1,133 |
| May | + 111 | 997 | 1,108 | 47 | 1,155 | 578 | 419 |
| June | +1,336 | 3,176 | 4,512 | 191 | 4,703 | 2,351 | 825 |
| July | + 132 | 1,411 | 1,543 | 65 | 1,608 | 804 | 607 |
| Aug. | - 142 | 676 | 534 | 23 | 557 | 279 | 397 |
| Sept. | - 31 | 179 | 156 | 6 | 162 | 81 | 98 |
| Oct. | - 21 | 21 | 20 | 1 | 21 | 10 | 11 |
| Total | +5,533 | 17,080 | 22,641 | 956 | 23,597 | 11,798 | 5,282 |
| Acre-feet | +10,975 | 33,878 | 44,908 | 1,896 * | 46,804 | 23,401 | 10,477 |

* - 4.22% of the apparent natural flow was used for the adjustments for minor diversions in Canada. This figure is based on the 1,895 estimated acre-feet total of minor diversions detailed in the Appendix to this report.

Table 3

MEASURED DIVERSIONS FROM THE EASTERN TRIBUTARIES
OF MILK RIVER IN THE UNITED STATES

1963

Quantities in acre-feet

| Month | Lodge Creek Basin | Battle Creek Basin | Frenchman River Basin |
|---|---|---|---|
| | North Chinook Canal | Matheson Canal Pumping | Frenchman Canal |
| March | 412 | -- | 371 |
| April | 1,400 | -- | 210 |
| May | 94 | -- | 930 |
| June | 0 | -- | 1,030 |
| July | 1,820 | -- | 746 |
| Aug. | 513 | -- | 1,290 |
| Sept. | 0 | -- | 186 |
| Oct. | 0 | -- | 0 |
| Total | 4,240 | 2,070[a] | 4,760 |

a Estimated use by pumping from Battle Creek to land under Matheson Canal.

Total of Measured Diversions from the Eastern Tributaries of Milk River in the United States = 11,070 acre-feet

Table 4

Measured Run-off of Eastern Tributaries of Milk River
at International Boundary for period March to October

1963

Quantities in acre-feet

| Month | Lodge Creek | Battle Creek | Woodpile Coulee | East Fork Battle Creek | Lyons Creek | Whitewater Creek | Frenchman River | Rock Cr. below Horse Cr. | McEachern Creek |
|---|---|---|---|---|---|---|---|---|---|
| March | 643 | 367 | 9 | 261 | 41 | 134 | 11,680 | 11,320 | 2,760 |
| April | 1,450 | 2,270 | 0 | 0 | 0 | 36 | 9,380 | 1,020 | 43 |
| May | 36 | 445 | 0 | 0 | 0 | 16 | 1,980 | 458 | 5 |
| June | 0 | 481 | 0 | 0 | 0 | 27 | 6,300 | 2,560 | 2,050 |
| July | 3,750 | 1,040 | 0 | 0 | 0 | 3 | 2,800 | 999 | 181 |
| Aug. | 207 | 5 | 0 | 0 | 0 | 0 | 1,340 | 114 | 0 |
| Sept. | 0 | 0 | 0 | 0 | 0 | 1 | 354 | 38 | 0 |
| Oct. | 0 | 0 | 0 | 0 | 0 | 5 | 42 | 48 | 0 |
| Totals | 6,090 | 4,610 | 9 | 261 | 41 | 222 | 33,880 | 16,560 | 5,040 |

Total measured run-off of Eastern Tributaries of Milk River
at International Boundary from March to October = **66,710 acre-feet.**

APRIL 1963
Table 5.

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.)

| 1963 Day APRIL | Computed Natural Flow St. Mary River at Int. Bdry. | Canada's share of St. Mary River Natural Flow | Recorded Flow of St. Mary River near Int. Bdry. | Canada received more (+) or less (-) than share + | - | U.S. share of St. Mary River | Storage Factors Lake Sherburne (1-day lag applied) Stored | Released | Diverted by St. Mary Canal | Net Used by United States | U.S. Used more (+) or less (-) than share + | - |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 364 | 273 | 279 | 6 | | 91 | 85 | | 0 | 85 | | 6 |
| 2 | 316 | 237 | 257 | 20 | | 79 | 59 | | 0 | 59 | | 20 |
| 3 | 289 | 217 | 205 | | 12 | 72 | 59 | | 25 | 84 | 12 | |
| 4 | 2 | 2 | 92 | 90 | | 0 | | 341 | 251 | -90 | | 90 |
| 5 | -38 | -28 | 122 | 150 | | -10 | | 550 | 390 | -160 | | 150 |
| 6 | -13 | -10 | 104 | 114 | | -3 | | 676 | 559 | -117 | | 114 |
| 7 | 102 | 76 | 155 | 79 | | 26 | | 667 | 614 | -53 | | 79 |
| 8 | 254 | 190 | 167 | | 23 | 64 | | 550 | 637 | 87 | 23 | |
| 9 | 265 | 199 | 201 | 2 | | 66 | | 596 | 660 | 64 | | 2 |
| 10 | 251 | 188 | 246 | 58 | | 63 | | 661 | 666 | 5 | | 58 |
| 11 | 253 | 190 | 246 | 56 | | 63 | | 672 | 679 | 7 | | 56 |
| 12 | 273 | 205 | 251 | 46 | | 68 | | 657 | 679 | 22 | | 46 |
| 13 | 295 | 221 | 246 | 25 | | 74 | | 630 | 679 | 49 | | 25 |
| 14 | 333 | 250 | 246 | | 4 | 83 | | 592 | 679 | 87 | 4 | |
| 15 | 413 | 310 | 251 | | 59 | 103 | | 523 | 685 | 162 | 59 | |
| 16 | 493 | 370 | 263 | | 107 | 123 | | 453 | 683 | 230 | 107 | |
| 17 | 392 | 294 | 279 | | 15 | 98 | | 572 | 685 | 113 | 15 | |
| 18 | 464 | 348 | 310 | | 38 | 116 | | 533 | 687 | 154 | 38 | |
| 19 | 434 | 326 | 316 | | 10 | 108 | | 569 | 687 | 118 | 10 | |
| 20 | 436 | 327 | 322 | | 5 | 109 | | 571 | 685 | 114 | 5 | |
| 21 | 434 | 326 | 328 | 2 | | 108 | | 581 | 687 | 106 | | 2 |
| 22 | 427 | 320 | 328 | 8 | | 107 | | 588 | 687 | 99 | | 8 |
| 23 | 379 | 284 | 322 | 38 | | 95 | | 630 | 687 | 57 | | 38 |
| 24 | 402 | 302 | 310 | 8 | | 100 | | 593 | 685 | 92 | | 8 |
| 25 | 391 | 293 | 297 | 4 | | 98 | | 591 | 685 | 94 | | 4 |
| 26 | 399 | 299 | 297 | | 2 | 100 | | 581 | 683 | 102 | 2 | |
| 27 | 491 | 368 | 316 | | 52 | 123 | | 498 | 673 | 175 | 52 | |
| 28 | 532 | 399 | 328 | | 71 | 133 | | 464 | 668 | 204 | 71 | |
| 29 | 633 | 475 | 360 | | 115 | 158 | | 395 | 668 | 273 | 115 | |
| 30 | 766 | 550 | 480 | | 70 | 216 | | 362 | 648 | 286 | 70 | |
| 31 | | | | | | | | | | | | |
| Total Sec.-ft. | 10,432 | 7,801 | 7,924 | (706) 123 | (583) | 2,631 | 203 | 15,096 | 17,401 | 2,508 | (583) | (706) 123 |
| Mean | 348 | 260 | 264 | 4.1 | | 87.7 | 6.8 | 503 | 580 | 83.6 | | 4.1 |
| Ac.-ft. | 20,692 | 15,473 | 15,717 | 244 | | 5,219 | 403 | 29,942 | 34,514 | 4,975 | | 244 |

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.)

| 1963 Day MAY | Computed Natural Flow St. Mary River at Int. Bdry. | Canada's share of St. Mary River Natural Flow | Recorded Flow of St. Mary River near Int. Bdry. | Canada received more (+) or less (-) than share + | Canada received more (+) or less (-) than share - | U.S. share of St. Mary River | Storage Factors Lake Sherburne (1-day lag applied) Stored | Storage Factors Lake Sherburne (1-day lag applied) Released | Diverted by St. Mary Canal | Net Used by United States | U.S. Used more (+) or less (-) than share + | U.S. Used more (+) or less (-) than share - |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 955 | 644 | 613 | | 31 | 311 | | 291 | 633 | 342 | 31 | |
| 2 | 1,025 | 679 | 678 | | 1 | 346 | | 273 | 620 | 347 | 1 | |
| 3 | 985 | 659 | 721 | 62 | | 326 | | 326 | 590 | 264 | | 62 |
| 4 | 925 | 629 | 730 | 101 | | 296 | | 397 | 592 | 195 | | 101 |
| 5 | 1,025 | 679 | 730 | 51 | | 346 | | 295 | 590 | 295 | | 51 |
| 6 | 1,132 | 733 | 747 | 14 | | 399 | | 215 | 600 | 385 | | 14 |
| 7 | 1,178 | 756 | 747 | | 9 | 422 | | 202 | 633 | 431 | 9 | |
| 8 | 1,442 | 888 | 830 | | 58 | 554 | | 25 | 637 | 612 | 58 | |
| 9 | 1,564 | 949 | 840 | | 109 | 615 | 87 | | 637 | 724 | 109 | |
| 10 | 1,656 | 995 | 747 | | 248 | 661 | 280 | | 629 | 909 | 248 | |
| 11 | 1,502 | 918 | 738 | | 180 | 584 | 170 | | 594 | 764 | 180 | |
| 12 | 1,360 | 847 | 738 | | 109 | 513 | 30 | | 592 | 622 | 109 | |
| 13 | 1,349 | 841 | 738 | | 103 | 508 | 21 | | 590 | 611 | 103 | |
| 14 | 1,220 | 777 | 840 | 63 | | 443 | | 201 | 581 | 380 | | 63 |
| 15 | 1,211 | 772 | 1,010 | 238 | | 439 | | 306 | 507 | 201 | | 238 |
| 16 | 1,416 | 875 | 1,010 | 135 | | 541 | | 119 | 525 | 406 | | 135 |
| 17 | 1,559 | 946 | 999 | 53 | | 613 | | 28 | 588 | 560 | | 53 |
| 18 | 1,663 | 998 | 1,060 | 62 | | 665 | 15 | | 588 | 603 | | 62 |
| 19 | 1,708 | 1,021 | 1,120 | 99 | | 687 | | 2 | 590 | 588 | | 99 |
| 20 | 1,718 | 1,026 | 1,110 | 84 | | 692 | 6 | | 602 | 608 | | 84 |
| 21 | 1,799 | 1,066 | 1,060 | | 6 | 733 | 87 | | 652 | 739 | 6 | |
| 22 | 1,896 | 1,115 | 1,130 | 15 | | 781 | 140 | | 626 | 766 | | 15 |
| 23 | 2,029 | 1,181 | 1,110 | | 71 | 848 | 232 | | 687 | 919 | 71 | |
| 24 | 2,205 | 1,269 | 1,220 | | 49 | 936 | 293 | | 692 | 985 | 49 | |
| 25 | 2,363 | 1,348 | 1,380 | 32 | | 1,015 | 287 | | 696 | 983 | | 32 |
| 26 | 2,585 | 1,459 | 1,570 | 111 | | 1,126 | 315 | | 700 | 1,015 | | 111 |
| 27 | 2,879 | 1,606 | 1,710 | 104 | | 1,273 | 467 | | 702 | 1,169 | | 104 |
| 28 | 2,923 | 1,628 | 1,650 | 22 | | 1,295 | 571 | | 702 | 1,273 | | 22 |
| 29 | 2,972 | 1,653 | 1,580 | | 73 | 1,319 | 690 | | 702 | 1,392 | 73 | |
| 30 | 3,038 | 1,686 | 1,640 | | 46 | 1,352 | 696 | | 702 | 1,398 | 46 | |
| 31 | 3,287 | 1,810 | 1,760 | | 50 | 1,477 | 825 | | 702 | 1,527 | 50 | |
| Total Sec.-ft. | 54,569 | 32,453 | 32,556 | (1,246) 103 | (1,143) | 22,116 | 5,212 | 2,680 | 19,481 | 22,013 | (1,143) | (1,246) 103 |
| Mean | 1,760 | 1,047 | 1,050 | 3.3 | | 713 | 168 | 86.5 | 628 | 710 | | 3.3 |
| Ac.-ft. | 108,236 | 64,370 | 64,574 | 204 | | 43,866 | 10,338 | 5,316 | 38,640 | 43,662 | | 204 |

Table 5.

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.)

| 1963 Day JUNE | Computed Natural Flow St. Mary River at Int. Bdry. | Canada's share of St. Mary River Natural Flow | Recorded Flow of St. Mary River near Int. Bdry. | Canada received more (+) or less (-) than share + | - | U.S. share of St. Mary River | Storage Factors Lake Sherburne (1-day lag applied) Stored | Released | Diverted by St. Mary Canal | Net Used by United States | U.S. Used more (+) or less (-) than share + | - |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3,410 | 1,872 | 1,830 | | 42 | 1,538 | 876 | | 704 | 1,580 | 42 | |
| 2 | 3,418 | 1,876 | 1,850 | | 26 | 1,542 | 862 | | 706 | 1,568 | 26 | |
| 3 | 3,356 | 1,845 | 1,910 | 65 | | 1,511 | 740 | | 706 | 1,446 | | 65 |
| 4 | 3,499 | 1,916 | 2,040 | 124 | | 1,583 | 753 | | 706 | 1,459 | | 124 |
| 5 | 3,717 | 2,025 | 2,190 | 165 | | 1,692 | 819 | | 708 | 1,527 | | 165 |
| 6 | 4,139 | 2,236 | 2,480 | 244 | | 1,903 | 946 | | 713 | 1,659 | | 244 |
| 7 | 4,129 | 2,231 | 2,440 | 209 | | 1,898 | 972 | | 717 | 1,689 | | 209 |
| 8 | 3,874 | 2,104 | 2,300 | 196 | | 1,770 | 857 | | 717 | 1,574 | | 196 |
| 9 | 3,704 | 2,019 | 2,210 | 191 | | 1,685 | 777 | | 717 | 1,494 | | 191 |
| 10 | 4,053 | 2,193 | 2,500 | 307 | | 1,860 | 836 | | 717 | 1,553 | | 307 |
| 11 | 4,368 | 2,351 | 2,560 | 209 | | 2,017 | 1,089 | | 719 | 1,808 | | 209 |
| 12 | 4,309 | 2,321 | 2,540 | 219 | | 1,988 | 1,056 | | 713 | 1,769 | | 219 |
| 13 | 4,121 | 2,227 | 2,420 | 193 | | 1,894 | 1,007 | | 694 | 1,701 | | 193 |
| 14 | 4,133 | 2,233 | 2,380 | 147 | | 1,900 | 1,021 | | 732 | 1,753 | | 147 |
| 15 | 3,985 | 2,159 | 2,320 | 161 | | 1,826 | 948 | | 717 | 1,665 | | 161 |
| 16 | 3,789 | 2,061 | 2,240 | 179 | | 1,728 | 836 | | 713 | 1,549 | | 179 |
| 17 | 3,624 | 1,979 | 2,150 | 171 | | 1,645 | 764 | | 710 | 1,474 | | 171 |
| 18 | 3,517 | 1,925 | 2,060 | 135 | | 1,592 | 751 | | 706 | 1,457 | | 135 |
| 19 | 3,443 | 1,888 | 2,010 | 122 | | 1,555 | 727 | | 706 | 1,433 | | 122 |
| 20 | 3,316 | 1,825 | 1,880 | 55 | | 1,491 | 732 | | 704 | 1,436 | | 55 |
| 21 | 3,125 | 1,729 | 1,800 | 71 | | 1,396 | 621 | | 704 | 1,325 | | 71 |
| 22 | 3,158 | 1,746 | 1,820 | 74 | | 1,412 | 632 | | 706 | 1,338 | | 74 |
| 23 | 2,947 | 1,640 | 1,680 | 40 | | 1,307 | 569 | | 698 | 1,267 | | 40 |
| 24 | 2,619 | 1,476 | 1,400 | | 76 | 1,143 | 527 | | 692 | 1,219 | 76 | |
| 25 | 2,338 | 1,336 | 1,210 | | 126 | 1,002 | 441 | | 687 | 1,128 | 126 | |
| 26 | 2,152 | 1,243 | 1,060 | | 183 | 909 | 409 | | 683 | 1,092 | 183 | |
| 27 | 2,104 | 1,219 | 977 | | 242 | 885 | 446 | | 681 | 1,127 | 242 | |
| 28 | 2,054 | 1,194 | 1,030 | | 164 | 860 | 341 | | 683 | 1,024 | 164 | |
| 29 | 2,249 | 1,291 | 1,350 | 59 | | 958 | 207 | | 692 | 899 | | 59 |
| 30 | 3,067 | 1,700 | 1,520 | | 180 | 1,367 | 857 | | 690 | 1,547 | 180 | |
| 31 | | | | | | | | | | | | |
| Total Sec.-ft. | 101,717 | 55,860 | 58,157 | (3,336) 2,297 | (1,039) | 45,857 | 22,419 | | 21,141 | 43,560 | (1,039) | (3,336) 2,297 |
| Mean | 3,391 | 1,862 | 1,939 | 76.6 | | 1,529 | 747 | | 705 | 1,452 | | 76.6 |
| Ac.-ft. | 201,753 | 110,797 | 115,353 | 4,556 | | 90,956 | 44,467 | | 41,933 | 86,400 | | 4,556 |

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.)

| 1963 Day JULY | Computed Natural Flow St. Mary River at Int. Bdry. | Canada's share of St. Mary River Natural Flow | Recorded Flow of St. Mary River near Int. Bdry. | Canada received more (+) or less (-) than share + | - | U.S. share of St. Mary River | Storage Factors Lake Sherburne (1-day lag applied) Stored | Released | Diverted by St. Mary Canal | Net Used by United States | U.S. Used more (+) or less (-) than share + | - |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3,054 | 1,694 | 1,370 | | 324 | 1,360 | 997 | | 687 | 1,684 | 324 | |
| 2 | 2,687 | 1,510 | 1,390 | | 120 | 1,177 | 607 | | 690 | 1,297 | 120 | |
| 3 | 2,454 | 1,394 | 1,440 | 46 | | 1,060 | 324 | | 690 | 1,014 | | 46 |
| 4 | 2,408 | 1,371 | 1,500 | 129 | | 1,037 | 218 | | 690 | 908 | | 129 |
| 5 | 2,452 | 1,393 | 1,530 | 137 | | 1,059 | 232 | | 690 | 922 | | 137 |
| 6 | 2,511 | 1,422 | 1,590 | 168 | | 1,089 | 229 | | 692 | 921 | | 168 |
| 7 | 2,527 | 1,430 | 1,590 | 160 | | 1,097 | 245 | | 692 | 937 | | 160 |
| 8 | 2,507 | 1,420 | 1,590 | 170 | | 1,087 | 227 | | 690 | 917 | | 170 |
| 9 | 2,472 | 1,403 | 1,560 | 157 | | 1,069 | 222 | | 690 | 912 | | 157 |
| 10 | 2,235 | 1,284 | 1,420 | 136 | | 951 | 123 | | 692 | 815 | | 136 |
| 11 | 2,190 | 1,262 | 1,260 | | 2 | 928 | 240 | | 690 | 930 | 2 | |
| 12 | 1,976 | 1,155 | 1,120 | | 35 | 821 | 171 | | 685 | 856 | 35 | |
| 13 | 1,909 | 1,121 | 1,030 | | 91 | 788 | 196 | | 683 | 879 | 91 | |
| 14 | 1,796 | 1,065 | 987 | | 78 | 731 | 130 | | 679 | 809 | 78 | |
| 15 | 1,756 | 1,045 | 945 | | 100 | 711 | 136 | | 675 | 811 | 100 | |
| 16 | 1,657 | 995 | 924 | | 71 | 662 | 58 | | 675 | 733 | 71 | |
| 17 | 1,495 | 914 | 945 | 31 | | 581 | | 125 | 675 | 550 | | 31 |
| 18 | 1,353 | 843 | 903 | 60 | | 510 | | 227 | 677 | 450 | | 60 |
| 19 | 1,285 | 809 | 842 | 33 | | 476 | | 242 | 685 | 443 | | 33 |
| 20 | 1,264 | 799 | 802 | 3 | | 465 | | 223 | 685 | 462 | | 3 |
| 21 | 1,229 | 781 | 764 | | 17 | 448 | | 218 | 683 | 465 | 17 | |
| 22 | 1,182 | 758 | 737 | | 21 | 424 | | 236 | 681 | 445 | 21 | |
| 23 | 1,144 | 739 | 709 | | 30 | 405 | | 244 | 679 | 435 | 30 | |
| 24 | 1,110 | 722 | 683 | | 39 | 388 | | 252 | 679 | 427 | 39 | |
| 25 | 1,116 | 725 | 656 | | 69 | 391 | | 219 | 679 | 460 | 69 | |
| 26 | 1,026 | 680 | 648 | | 32 | 346 | | 299 | 677 | 378 | 32 | |
| 27 | 916 | 625 | 622 | | 3 | 291 | | 381 | 675 | 294 | 3 | |
| 28 | 845 | 589 | 589 | | 0 | 256 | | 419 | 675 | 256 | 0 | |
| 29 | 844 | 589 | 556 | | 33 | 255 | | 385 | 673 | 288 | 33 | |
| 30 | 794 | 564 | 525 | | 39 | 230 | | 404 | 673 | 269 | 39 | |
| 31 | 766 | 550 | 495 | | 55 | 216 | | 400 | 671 | 271 | 55 | |
| Total Sec.-ft. | 52,960 | 31,651 | 31,722 | (1,230) 71 | (1,159) | 21,309 | 4,355 | 4,274 | 21,157 | 21,238 | (1,159) | (1,230) 71 |
| Mean | 1,708 | 1,021 | 1,023 | 2.3 | | 687 | 140 | 138 | 682 | 685 | | 2.3 |
| Ac.-ft. | 105,045 | 62,779 | 62,920 | 141 | | 42,266 | 8,638 | 8,477 | 41,964 | 42,125 | | 141 |

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.)

| 1963 Day AUGUST | Computed Natural Flow St. Mary River at Int. Bdry. | Canada's share of St. Mary River Natural Flow | Recorded Flow of St. Mary River near Int. Bdry. | Canada received more (+) or less (-) than share + | Canada received more (+) or less (-) than share - | U.S. share of St. Mary River | Storage Factors Lake Sherburne (1-day lag applied) Stored | Storage Factors Lake Sherburne (1-day lag applied) Released | Diverted by St. Mary Canal | Net Used by United States | U.S. Used more (+) or less (-) than share + | U.S. Used more (+) or less (-) than share - |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 717 | 525 | 502 | | 23 | 192 | | 460 | 675 | 215 | 23 | |
| 2 | 719 | 526 | 480 | | 46 | 193 | | 444 | 683 | 239 | 46 | |
| 3 | 662 | 496 | 444 | | 52 | 166 | | 478 | 696 | 218 | 52 | |
| 4 | 647 | 485 | 465 | | 20 | 162 | | 514 | 696 | 182 | 20 | |
| 5 | 596 | 447 | 465 | 18 | | 149 | | 565 | 696 | 131 | | 18 |
| 6 | 594 | 446 | 458 | 12 | | 148 | | 560 | 696 | 136 | | 12 |
| 7 | 626 | 470 | 451 | | 19 | 156 | | 521 | 696 | 175 | 19 | |
| 8 | 589 | 442 | 438 | | 4 | 147 | | 543 | 694 | 151 | 4 | |
| 9 | 644 | 483 | 458 | | 25 | 161 | | 508 | 694 | 186 | 25 | |
| 10 | 606 | 454 | 458 | 4 | | 152 | | 548 | 696 | 148 | | 4 |
| 11 | 682 | 508 | 465 | | 43 | 174 | | 477 | 694 | 217 | 43 | |
| 12 | 664 | 498 | 458 | | 40 | 166 | | 486 | 692 | 206 | 40 | |
| 13 | 622 | 466 | 451 | | 15 | 156 | | 523 | 694 | 171 | 15 | |
| 14 | 642 | 482 | 465 | | 17 | 160 | | 517 | 694 | 177 | 17 | |
| 15 | 644 | 483 | 465 | | 18 | 161 | | 515 | 694 | 179 | 18 | |
| 16 | 642 | 482 | 465 | | 17 | 160 | | 515 | 692 | 177 | 17 | |
| 17 | 594 | 446 | 465 | 19 | | 148 | | 563 | 692 | 129 | | 19 |
| 18 | 540 | 405 | 465 | 60 | | 135 | | 617 | 692 | 75 | | 60 |
| 19 | 526 | 394 | 451 | 57 | | 132 | | 615 | 690 | 75 | | 57 |
| 20 | 524 | 393 | 431 | 38 | | 131 | | 594 | 687 | 93 | | 38 |
| 21 | 465 | 349 | 410 | 61 | | 116 | | 632 | 687 | 55 | | 61 |
| 22 | 468 | 351 | 378 | 27 | | 117 | | 597 | 687 | 90 | | 27 |
| 23 | 503 | 377 | 366 | | 11 | 126 | | 548 | 685 | 137 | 11 | |
| 24 | 416 | 312 | 366 | 54 | | 104 | | 635 | 685 | 50 | | 54 |
| 25 | 464 | 348 | 366 | 18 | | 116 | | 585 | 683 | 98 | | 18 |
| 26 | 418 | 314 | 341 | 27 | | 104 | | 606 | 683 | 77 | | 27 |
| 27 | 447 | 335 | 329 | | 6 | 112 | | 565 | 683 | 118 | 6 | |
| 28 | 385 | 289 | 302 | 13 | | 96 | | 600 | 683 | 83 | | 13 |
| 29 | 396 | 297 | 286 | | 11 | 99 | | 569 | 679 | 110 | 11 | |
| 30 | 399 | 299 | 265 | | 34 | 100 | | 545 | 679 | 134 | 34 | |
| 31 | 351 | 263 | 250 | | 13 | 88 | | 578 | 679 | 101 | 13 | |
| Total Sec.-ft. | 17,192 | 12,865 | 12,859 | (408) | (414) 6 | 4,327 | | 17,023 | 21,356 | 4,333 | (414) 6 | (408) |
| Mean | 555 | 415 | 415 | | 0.2 | 140 | | 549 | 689 | 140 | 0.2 | |
| Ac.-ft. | 34,100 | 25,517 | 25,505 | | 11.9 | 8,582 | | 33,765 | 42,359 | 8,594 | 11.9 | |

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.)

| 1963 Day SEPTEMBER | Computed Natural Flow St. Mary River at Int. Bdry. | Canada's share of St. Mary River Natural Flow | Recorded Flow of St. Mary River near Int. Bdry. | Canada received more (+) or less (-) than share + | Canada received more (+) or less (-) than share - | U.S. share of St. Mary River | Storage Factors Lake Sherburne (1-day lag applied) Stored | Storage Factors Lake Sherburne (1-day lag applied) Released | Diverted by St. Mary Canal | Net Used by United States | U.S. Used more (+) or less (-) than share + | U.S. Used more (+) or less (-) than share - |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 341 | 256 | 246 | | 10 | 85 | | 584 | 679 | 95 | 10 | |
| 2 | 352 | 264 | 255 | | 9 | 88 | | 582 | 679 | 97 | 9 | |
| 3 | 328 | 246 | 255 | 9 | | 82 | | 606 | 679 | 73 | | 9 |
| 4 | 357 | 268 | 265 | | 3 | 89 | | 587 | 679 | 92 | 3 | |
| 5 | 306 | 230 | 270 | 40 | | 76 | | 645 | 681 | 36 | | 40 |
| 6 | 302 | 226 | 270 | 44 | | 76 | | 647 | 679 | 32 | | 44 |
| 7 | 313 | 235 | 280 | 45 | | 78 | | 648 | 681 | 33 | | 45 |
| 8 | 331 | 248 | 280 | 32 | | 83 | | 632 | 683 | 51 | | 32 |
| 9 | 328 | 246 | 275 | 29 | | 82 | | 628 | 681 | 53 | | 29 |
| 10 | 366 | 274 | 286 | 12 | | 92 | | 591 | 671 | 80 | | 12 |
| 11 | 357 | 268 | 286 | 18 | | 89 | | 600 | 671 | 71 | | 18 |
| 12 | 354 | 266 | 260 | | 6 | 88 | | 574 | 668 | 94 | 6 | |
| 13 | 447 | 335 | 236 | | 99 | 112 | | 455 | 666 | 211 | 99 | |
| 14 | 453 | 340 | 226 | | 114 | 113 | | 439 | 666 | 227 | 114 | |
| 15 | 442 | 332 | 204 | | 128 | 110 | | 428 | 666 | 238 | 128 | |
| 16 | 534 | 400 | 222 | | 178 | 134 | | 336 | 648 | 312 | 178 | |
| 17 | 546 | 410 | 226 | | 184 | 136 | | 274 | 594 | 320 | 184 | |
| 18 | 546 | 410 | 236 | | 174 | 136 | | 229 | 539 | 310 | 174 | |
| 19 | 423 | 317 | 366 | 49 | | 106 | | 321 | 378 | 57 | | 49 |
| 20 | 359 | 269 | 517 | 248 | | 90 | | 339 | 181 | -158 | | 248 |
| 21 | 380 | 285 | 572 | 287 | | 95 | | 212 | 20 | -192 | | 287 |
| 22 | 471 | 353 | 517 | 164 | | 118 | | 58 | 12 | -46 | | 164 |
| 23 | 444 | 333 | 495 | 162 | | 111 | | 55 | 4 | -51 | | 162 |
| 24 | 403 | 302 | 458 | 156 | | 101 | | 55 | 0 | -55 | | 156 |
| 25 | 680 | 507 | 417 | | 90 | 173 | 263 | | 0 | 263 | 90 | |
| 26 | 527 | 395 | 378 | | 17 | 132 | 149 | | 0 | 149 | 17 | |
| 27 | 380 | 285 | 360 | 75 | | 95 | 20 | | 0 | 20 | | 75 |
| 28 | 370 | 278 | 353 | 75 | | 92 | 17 | | 0 | 17 | | 75 |
| 29 | 361 | 271 | 347 | 76 | | 90 | 14 | | 0 | 14 | | 76 |
| 30 | 352 | 264 | 335 | 71 | | 88 | 17 | | 0 | 17 | | 71 |
| 31 | | | | | | | | | | | | |
| Total Sec.-ft. | 12,153 | 9,113 | 9,693 | (1,592) 580 | (1,012) | 3,040 | 480 | 10,525 | 12,505 | 2,460 | (1,012) | (1,592) 580 |
| Mean | 405 | 304 | 323 | 19.3 | | 101 | 16.0 | 351 | 417 | 82.0 | | 19.3 |
| Ac.-ft. | 24,105 | 18,075 | 19,226 | 1,150 | | 6,030 | 952 | 20,876 | 24,803 | 4,879 | | 1,150 |

NATURAL FLOW OF ST. MARY RIVER AT INTERNATIONAL BOUNDARY AND ITS DIVISION BETWEEN CANADA AND UNITED STATES (Cu. ft. per sec.)

| 1963 Day OCTOBER | Computed Natural Flow St. Mary River at Int. Bdry. | Canada's share of St. Mary River Natural Flow | Recorded Flow of St. Mary River near Int. Bdry. | Canada received more (+) or less (-) than share + | - | U.S. share of St. Mary River | Storage Factors Lake Sherburne (1-day lag applied) Stored | Released | Diverted by St. Mary Canal | Net Used by United States | U.S. Used more (+) or less (-) than share + | - |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 348 | 261 | 329 | 68 | | 87 | 19 | | 0 | 19 | | 68 |
| 2 | 333 | 250 | 329 | 79 | | 83 | 4 | | 0 | 4 | | 79 |
| 3 | 299 | 224 | 318 | 94 | | 75 | | 19 | 0 | -19 | | 94 |
| 4 | 297 | 223 | 302 | 79 | | 74 | | 5 | 0 | -5 | | 79 |
| 5 | 305 | 229 | 307 | 78 | | 76 | | 2 | 0 | -2 | | 78 |
| 6 | 305 | 229 | 307 | 78 | | 76 | | 2 | 0 | -2 | | 78 |
| 7 | 303 | 227 | 302 | 75 | | 76 | 1 | | 0 | 1 | | 75 |
| 8 | 301 | 226 | 297 | 71 | | 75 | 4 | | 0 | 4 | | 71 |
| 9 | 329 | 247 | 270 | 23 | | 82 | 59 | | 0 | 59 | | 23 |
| 10 | 306 | 230 | 255 | 25 | | 76 | 51 | | 0 | 51 | | 25 |
| 11 | 287 | 215 | 236 | 21 | | 72 | 51 | | 0 | 51 | | 21 |
| 12 | 283 | 212 | 226 | 14 | | 71 | 57 | | 0 | 57 | | 14 |
| 13 | 280 | 210 | 217 | 7 | | 70 | 63 | | 0 | 63 | | 7 |
| 14 | 250 | 188 | 200 | 12 | | 62 | 50 | | 0 | 50 | | 12 |
| 15 | 242 | 182 | 195 | 13 | | 60 | 47 | | 0 | 47 | | 13 |
| 16 | 223 | 167 | 186 | 19 | | 56 | 37 | | 0 | 37 | | 19 |
| 17 | 216 | 162 | 182 | 20 | | 54 | 34 | | 0 | 34 | | 20 |
| 18 | 208 | 156 | 174 | 18 | | 52 | 34 | | 0 | 34 | | 18 |
| 19 | 205 | 154 | 167 | 13 | | 51 | 38 | | 0 | 38 | | 13 |
| 20 | 215 | 161 | 171 | 10 | | 54 | 44 | | 0 | 44 | | 10 |
| 21 | 218 | 164 | 163 | | 1 | 54 | 55 | | 0 | 55 | 1 | |
| 22 | 234 | 176 | 178 | 2 | | 58 | 56 | | 0 | 56 | | 2 |
| 23 | 226 | 170 | 167 | | 3 | 56 | 59 | | 0 | 59 | 3 | |
| 24 | 270 | 202 | 171 | | 31 | 68 | 99 | | 0 | 99 | 31 | |
| 25 | 309 | 232 | 171 | | 61 | 77 | 138 | | 0 | 138 | 61 | |
| 26 | 316 | 237 | 174 | | 63 | 79 | 142 | | 0 | 142 | 63 | |
| 27 | 293 | 220 | 174 | | 46 | 73 | 119 | | 0 | 119 | 46 | |
| 28 | 263 | 197 | 178 | | 19 | 66 | 85 | | 0 | 85 | 19 | |
| 29 | 263 | 197 | 178 | | 19 | 66 | 85 | | 0 | 85 | 19 | |
| 30 | 252 | 189 | 171 | | 18 | 63 | 81 | | 0 | 81 | 18 | |
| 31 | 253 | 190 | 167 | | 23 | 63 | 86 | | 0 | 86 | 23 | |
| Total Sec.-ft. | 8,432 | 6,327 | 6,862 | (819) 535 | (284) | 2,105 | 1,598 | 28 | 0 | 1,570 | (284) | (819) 535 |
| Mean | 272 | 204 | 221 | 17.3 | | 67.9 | 51.5 | 0.9 | 0 | 50.6 | | 17.3 |
| Ac.-ft. | 16,725 | 12,549 | 13,611 | 1,061 | | 4,175 | 3,170 | 55.5 | 0 | 3,114 | | 1,061 |

# Historical Summary of Natural Flow of St. Mary River at International Boundary

| Year | Mean Monthly Discharge In Cubic Feet Per Second During Irrigation Season April - October | | | | | | | Run-off in Acre-feet | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | April | May | June | July | August | September | October | Non Irrigation Season Nov.-Mar. | Irrigation Season Apr.-Oct. | For Year Nov.-Oct. |
| 1901-02 | - | - | - | - | - | 618 d | 477 d | - | 66,111 z | 66,111 z |
| 1902-03 | 568 | 1726 | 5200 | 2924 | 1404 | 1109 | 917 | 57,965 | 837,816 | 895,781 |
| 1903-04 | 724 | 2022 | 2936 | 1903 | 933 | 420 | 221 | 96,361 | 555,162 | 651,523 |
| 1904-05 | 304 | 1215 | 2461 | 1642 | 847 | 371 | 772 | 39,128 | 461,855 | 500,983 |
| 1905-06 | 481 | 1504 | 2285 | 1826 | 946 | 628 | 756 | 51,592 | 511,307 | 562,899 |
| 1906-07 | 489 | 1931 | 4259 | 3117 | 1335 | 1214 | 632 | 124,082 | 785,988 | 910,070 |
| 1907-08 | 844 | 2485 | 7500 | 2488 | 834 | 462 | 481 | 62,436 | 910,631 | 973,067 |
| 1908-09 | 350 | 1904 | 5169 | 3000 | 1460 | 640 | 450 | 65,276 | 785,464 | 850,740 |
| 1909-10 | 1188 | 2315 | 2243 | 1175 | 580 | 553 | 1036 | 87,729 | 551,042 | 638,771 |
| 1910-11 | 520 | 2035 | 3470 | 1679 | 1053 | 1380 | 621 | 97,349 | 650,860 | 748,209 |
| 1911-12 | 542 | 2031 | 2347 | 1582 | 887 | 524 | 423 | 59,092 | 505,795 | 564,887 |
| 1912-13 | 749 | 1913 | 4519 | 2024 | 1162 | 574 | 448 | 69,604 | 688,735 | 758,339 |
| 1913-14 | 637 | 2230 | 2298 | 1430 | 719 | 584 | 841 | 58,564 | 530,307 | 588,871 |
| 1914-15 | 575 | 1644 | 2251 | 1722 | 969 | 842 | 739 | 83,970 | 530,287 | 614,257 |
| 1915-16 | 664 | 1707 | 4634 | 3463 | 1228 | 947 | 391 | 109,773 | 789,058 | 898,831 |
| 1916-17 | 453 | 2215 | 4104 | 2427 | 759 | 470 | 378 | 58,828 | 654,520 | 713,348 |
| 1917-18 | 661 | 1875 | 3093 | 1185 | 763 | 489 | 394 | 91,256 | 511,779 | 603,035 |
| 1918-19 | 340 | 1978 | 2116 | 919 | 498 | 336 | 186 | 49,684 | 386,325 | 436,009 |
| 1919-20 | 429 | 1720 | 3133 | 2355 | 800 | 572 | 557 | 61,025 | 579,977 | 641,002 |
| 1920-21 | 646 | 2664 | 3713 | 1809 | 755 | 416 | 499 | 72,117 | 636,167 | 708,284 |
| 1921-22 | 282 | 2293 | 3835 | 1578 | 642 | 420 | 301 | 64,657 | 565,880 | 630,537 |
| 1922-23 | 422 | 2286 | 3359 | 1726 | 788 | 482 | 560 | 47,191 | 583,204 | 630,395 |
| 1923-24 | 393 | 2080 | 3152 | 1534 | 728 | 397 | 302 | 51,406 | 520,145 | 571,551 |
| 1924-25 | 1272 | 3461 | 3512 | 1893 | 807 | 542 | 406 | 78,619 | 720,710 | 799,329 |
| 1925-26 | 670 | 1264 | 1078 | 818 | 405 | 751 | 1141 | 49,198 | 371,837 | 421,035 |
| 1926-27 | 600 | 2685 | 5434 | 2812 | 1274 | 1509 | 1143 | 74,838 | 935,423 | 1,010,261 |
| 1927-28 | 546 | 3695 | 2940 | 2594 | 921 | 513 | 863 | 112,116 | 734,376 | 846,492 |
| 1928-29 | 314 | 1837 | 2558 | 1272 | 493 | 291 | 289 | 66,040 | 427,448 | 493,488 |
| 1929-30 | 1477 | 2425 | 2489 | 1264 | 511 | 370 | 314 | 52,374 | 535,575 | 587,949 |
| 1930-31 | 224 | 1957 | 1838 | 796 | 592 | 464 | 294 | 38,856 | 374,083 | 412,939 |
| 1931-32 | 567 | 2497 | 2896 | 1409 | 595 | 307 | 240 | 83,750 | 515,819 | 599,569 |
| 1932-33 | 416 | 1764 | 4339 | 2169 | 766 | 492 | 685 | 67,488 | 643,242 | 710,730 |
| 1933-34 | 1734 | 3441 | 2929 | 1155 | 540 | 323 | 269 | 168,272 | 629,044 | 797,316 |
| 1934-35 | 392 | 1841 | 2716 | 1516 | 630 | 387 | 235 | 136,576 | 467,568 | 604,144 |
| 1935-36 | 617 | 2417 | 2152 | 823 | 420 | 252 | 162 | 30,004 | 414,845 | 444,849 |
| 1936-37 | 267 | 1797 | 3752 | 1409 | 475 | 298 | 285 | 34,013 | 500,701 | 534,714 |
| 1937-38 | 696 | 2611 | 3323 | 1622 | 510 | 360 | 322 | 65,262 | 571,983 | 637,245 |
| 1938-39 | 640 | 2271 | 1721 | 1069 | 459 | 292 | 188 | 59,359 | 402,996 | 462,355 |
| 1939-40 | 381 | 1560 | 1802 | 737 | 382 | 427 | 415 | 37,815 | 364,056 | 401,871 |
| 1940-41 | 364 | 1333 | 1429 | 879 | 359 | 520 | 635 | 32,842 | 334,846 | 367,688 |
| 1941-42 | 676 | 1890 | 2773 | 1824 | 754 | 526 | 397 | 94,304 | 535,668 | 629,972 |
| 1942-43 | 1240 | 1996 | 3722 | 2691 | 810 | 376 | 328 | 63,366 | 675,767 | 739,133 |
| 1943-44 | 197 | 1273 | 1634 | 809 | 536 | 424 | 374 | 36,343 | 318,121 | 354,464 |
| 1944-45 | 153 | 2030 | 3382 | 1455 | 457 | 486 | 421 | 46,471 | 505,676 | 552,147 |
| 1945-46 | 658 | 2361 | 2731 | 1500 | 571 | 495 | 521 | 76,816 | 535,571 | 612,387 |
| 1946-47 | 913 | 2729 | 2585 | 1634 | 657 | 526 | 1250 | 86,866 | 624,962 | 711,828 |
| 1947-48 | 521 | 2963 | 5486 | 1576 | 758 | 329 | 266 | 71,379 | 725,024 | 796,403 |
| 1948-49 | 526 | 2337 | 2272 | 991 | 471 | 532 | 404 | 35,419 | 456,637 | 492,056 |
| 1949-50 | 462 | 1969 | 4537 | 3159 | 1100 | 492 | 929 | 96,111 | 766,778 | 862,889 |
| 1950-51 | 819 | 3166 | 3431 | 3230 | 1128 | 1209 | 1390 | 141,366 | 885,233 | 1,026,599 |
| 1951-52 | 969 | 2408 | 2204 | 1433 | 839 | 409 | 264 | 82,832 | 517,093 | 599,925 |
| 1952-53 | 635 | 2716 | 5534 | 2519 | 887 | 438 | 283 | 62,545 | 786,960 | 849,505 |
| 1953-54 | 435 | 3137 | 3637 | 3184 | 1100 | 771 | 736 | 62,618 | 795,874 | 858,492 |
| 1954-55 | 267 | 1491 | 3755 | 2248 | 799 | 363 | 810 | 79,260 | 589,738 | 668,998 |
| 1955-56 | 525 | 2793 | 3631 | 2027 | 828 | 441 | 513 | 89,020 | 652,395 | 741,415 |
| 1956-57 | 275 | 3569 | 2947 | 1077 | 478 | 303 | 332 | 59,363 | 545,264 | 604,627 |
| 1957-58 | 401 | 2754 | 2847 | 1182 | 556 | 482 | 529 | 58,512 | 530,645 | 589,157 |
| 1958-59 | 702 | 2110 | 4056 | 2128 | 799 | 1035 | 979 | 93,513 | 714,693 | 808,206 |
| 1959-60 | 588 | 1387 | 3049 | 1604 | 646 | 374 | 237 | 95,385 | 482,907 | 578,292 |
| 1960-61 | 425 | 2223 | 3774 | 1324 | 566 | 406 | 658 | 58,502 | 566,754 | 625,256 |
| Average | 593 | 2212 | 3271 | 1785 | 762 | 548 | 532 | 71,805 | 587,943 | 659,748 |

This table contains revisions to formerly reported data.

Natural flow records computed on basis of Lake Sherburne storage and release records as published in the original reports to the International Joint Commission.

d - 1902 data not used.
z - Partial record not included in average.

Historical Summary
of
Natural Flow of St. Mary River at International Boundary

**TABLE 6**
**Page 2**

| Year | Mean Monthly Discharge In Cubic Feet Per Second During Irrigation Season April - October | | | | | | | Run-off in Acre-feet | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | April | May | June | July | August | September | October | Non Irrigation Season Nov.-Mar. | Irrigation Season Apr.-Oct. | For Year Nov.-Oct. |
| 1961-62 | 806 | 1840 | 2590 | 1265 | 728 | 435 | 658 515 | 143 60,686 | 495,327 8793 | 556,013 565 |
| **1962-63** | **348** | **1760** | **3391** | **1708** | **555** | **405** | **272** | 243 **99,509** | **510,656** 14941 | **610,165** 625 |
| **Average** | **593** | **2198** | **3262** | **1776** | **758** | **544** | **528** | **72,077** | **585,157** | **657,234** |

**This table contains revisions to formerly reported data.**

**Natural flow records computed on the basis of Lake Sherburne storage and release records as published in the original reports to the International Joint Commission.**

TABLE 7
Page 1

## Historical Summary of United States Share of Natural Flow of St. Mary River at International Boundary

| Year | Mean Monthly Discharge In Cubic feet per second During Irrigation Season April - October | | | | | | | Run-off in Acre-feet | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | April [z] | May | June | July | August | September | October | Non Irrigation Season Nov.-Mar. | Irrigation Season Apr.-Oct. | For Year Nov.-Oct. |
| 1901-02 | - | - | - | - | - | 156 [d] | 119 [d] | - | 16,637 [z] | 16,637 [z] |
| 1902-03 | 170 | 696 | 2433 | 1306 | 535 | 388 | 295 | 28,983 | 352,098 | 381,081 |
| 1903-04 | 221 | 844 | 1301 | 784 | 302 | 105 | 55.2 | 48,180 | 218,938 | 267,118 |
| 1904-05 | 79.4 | 442 | 1064 | 654 | 268 | 92.4 | 241 | 19,564 | 172,185 | 191,749 |
| 1905-06 | 144 | 586 | 976 | 746 | 306 | 174 | 221 | 25,796 | 191,286 | 217,082 |
| 1906-07 | 152 | 801 | 1962 | 1392 | 500 | 440 | 174 | 62,041 | 326,525 | 388,566 |
| 1907-08 | 302 | 1076 | 3583 | 1077 | 256 | 115 | 120 | 31,218 | 393,572 | 424,790 |
| 1908-09 | 88 | 785 | 2418 | 1333 | 563 | 174 | 112 | 32,638 | 331,192 | 363,830 |
| 1909-10 | 436 | 991 | 954 | 421 | 150 | 150 | 351 | 43,865 | 208,947 | 252,812 |
| 1910-11 | 136 | 851 | 1568 | 672 | 360 | 523 | 170 | 48,674 | 258,357 | 307,031 |
| 1911-12 | 139 | 849 | 1006 | 624 | 280 | 131 | 106 | 29,546 | 190,175 | 219,721 |
| 1912-13 | 244 | 789 | 2092 | 845 | 414 | 150 | 112 | 34,802 | 280,792 | 315,594 |
| 1913-14 | 192 | 949 | 982 | 548 | 197 | 154 | 253 | 29,282 | 198,764 | 228,046 |
| 1914-15 | 167 | 655 | 958 | 694 | 318 | 256 | 205 | 41,985 | 197,290 | 239,275 |
| 1915-16 | 172 | 686 | 2150 | 1565 | 447 | 314 | 97.8 | 54,886 | 328,788 | 383,674 |
| 1916-17 | 116 | 949 | 1885 | 1047 | 215 | 117 | 94.6 | 29,414 | 267,802 | 297,216 |
| 1917-18 | 191 | 782 | 1380 | 426 | 218 | 122 | 98.4 | 45,628 | 194,448 | 240,076 |
| 1918-19 | 90.7 | 822 | 891 | 295 | 125 | 84.0 | 46.5 | 24,842 | 142,621 | 167,463 |
| 1919-20 | 116 | 699 | 1400 | 1011 | 241 | 146 | 142 | 30,512 | 227,566 | 258,078 |
| 1920-21 | 180 | 1165 | 1690 | 738 | 219 | 104 | 126 | 36,059 | 255,689 | 291,748 |
| 1921-22 | 75.8 | 980 | 1750 | 622 | 170 | 105 | 75.0 | 32,328 | 228,434 | 260,762 |
| 1922-23 | 109 | 976 | 1513 | 696 | 232 | 122 | 146 | 23,596 | 229,833 | 253,429 |
| 1923-24 | 98.7 | 878 | 1409 | 600 | 200 | 99.0 | 75.5 | 25,703 | 203,399 | 229,102 |
| 1924-25 | 470 | 1564 | 1589 | 779 | 238 | 136 | 102 | 39,310 | 295,509 | 334,819 |
| 1925-26 | 226 | 465 | 372 | 251 | 101 | 214 | 410 | 24,599 | 123,780 | 148,379 |
| 1926-27 | 208 | 1176 | 2550 | 1239 | 470 | 588 | 405 | 37,419 | 401,387 | 438,806 |
| 1927-28 | 152 | 1681 | 1303 | 1130 | 296 | 130 | 282 | 56,058 | 302,731 | 358,789 |
| 1928-29 | 78.5 | 752 | 1112 | 469 | 124 | 72.8 | 72.2 | 33,020 | 162,343 | 195,363 |
| 1929-30 | 572 | 1046 | 1078 | 465 | 128 | 92.5 | 78.8 | 26,187 | 209,274 | 235,461 |
| 1930-31 | 50.1 | 813 | 752 | 233 | 168 | 116 | 73.5 | 19,428 | 134,186 | 153,614 |
| 1931-32 | 153 | 1082 | 1281 | 537 | 151 | 76.8 | 59.9 | 41,875 | 202,453 | 244,328 |
| 1932-33 | 116 | 715 | 2003 | 918 | 220 | 123 | 223 | 33,744 | 261,031 | 294,775 |
| 1933-34 | 210 | 1554 | 1298 | 411 | 139 | 80.5 | 67.3 | 84,136 | 257,770 | 341,906 |
| 1934-35 | 103 | 754 | 1191 | 591 | 171 | 96.7 | 58.9 | 68,288 | 179,546 | 247,834 |
| 1935-36 | 191 | 1042 | 910 | 250 | 105 | 62.9 | 40.5 | 15,002 | 157,613 | 172,615 |
| 1936-37 | 66.8 | 734 | 1709 | 538 | 121 | 74.5 | 71.3 | 17,006 | 200,099 | 217,105 |
| 1937-38 | 225 | 1139 | 1495 | 644 | 129 | 90.1 | 80.5 | 32,631 | 230,229 | 262,860 |
| 1938-39 | 202 | 969 | 694 | 368 | 115 | 72.9 | 47.0 | 29,680 | 149,764 | 179,444 |
| 1939-40 | 95.9 | 764 | 734 | 208 | 95.5 | 109 | 104 | 18,907 | 127,835 | 146,742 |
| 1940-41 | 93.4 | 500 | 548 | 281 | 89.7 | 133 | 167 | 16,421 | 109,876 | 126,297 |
| 1941-42 | 215 | 778 | 1219 | 746 | 221 | 134 | 99.6 | 47,152 | 206,753 | 253,905 |
| 1942-43 | 465 | 831 | 1694 | 1179 | 251 | 94.0 | 82.1 | 31,683 | 278,134 | 309,817 |
| 1943-44 | 49.2 | 475 | 650 | 254 | 136 | 106 | 93.4 | 18,172 | 106,824 | 124,996 |
| 1944-45 | 38.3 | 841 | 1524 | 561 | 115 | 123 | 105 | 23,235 | 200,071 | 223,306 |
| 1945-46 | 211 | 1014 | 1199 | 583 | 149 | 124 | 135 | 38,408 | 206,912 | 245,320 |
| 1946-47 | 305 | 1138 | 1126 | 650 | 176 | 136 | 458 | 43,433 | 245,873 | 289,306 |
| 1947-48 | 201 | 1315 | 2576 | 621 | 223 | 82.1 | 66.6 | 35,690 | 306,970 | 342,660 |
| 1948-49 | 148 | 1002 | 969 | 329 | 118 | 143 | 101 | 17,709 | 170,269 | 187,978 |
| 1949-50 | 116 | 827 | 2102 | 1413 | 383 | 127 | 325 | 48,056 | 320,765 | 368,821 |
| 1950-51 | 251 | 1516 | 1549 | 1448 | 397 | 438 | 528 | 70,683 | 372,351 | 443,034 |
| 1951-52 | 348 | 1037 | 935 | 550 | 260 | 102 | 66.1 | 41,416 | 200,079 | 241,495 |
| 1952-53 | 218 | 1191 | 2600 | 1093 | 281 | 109 | 70.7 | 31,272 | 336,248 | 367,520 |
| 1953-54 | 111 | 1462 | 1652 | 1425 | 383 | 227 | 214 | 31,309 | 332,634 | 363,943 |
| 1954-55 | 66.9 | 590 | 1711 | 957 | 245 | 90.6 | 265 | 39,630 | 237,646 | 277,276 |
| 1955-56 | 153 | 1230 | 1649 | 847 | 250 | 111 | 130 | 44,510 | 264,855 | 309,365 |
| 1956-57 | 70.2 | 1618 | 1306 | 372 | 120 | 75.8 | 82.9 | 29,682 | 221,248 | 250,930 |
| 1957-58 | 100 | 1215 | 1257 | 424 | 143 | 128 | 132 | 29,256 | 206,065 | 235,321 |
| 1958-59 | 201 | 838 | 1861 | 897 | 237 | 351 | 325 | 46,756 | 287,954 | 334,710 |
| 1959-60 | 191 | 529 | 1358 | 635 | 183 | 93.6 | 59.3 | 47,693 | 184,278 | 231,971 |
| 1960-61 | 104 | 949 | 1720 | 495 | 144 | 101 | 188 | 29,251 | 223,748 | 252,999 |
| Average | 184 | 941 | 1468 | 727 | 234 | 156 | 156 | 35,903 | 234,132 | 270,035 |

This table contains revisions to formerly reported data.

Natural flow records computed on basis of Lake Sherburne storage and release records as published in the original reports to the International Joint Commission.

d - 1902 data not used.
z - Partial record not included in average.

TABLE 7
Page 1

TABLE 7
Page 2

Historical Summary
of United States Share of
Natural Flow of St. Mary River at International Boundary

| Year | Mean Monthly Discharge In Cubic Feet Per Second During Irrigation Season April - October | | | | | | | Run-off in Acre-feet | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | April | May | June | July | August | September | October | Non Irrigation Season Nov.-Mar. | Irrigation Season Apr.-Oct. | For Year Nov.-Oct. |
| 1961-62 | 285 | 753 | 1128 | 466 | 211 | 109 | 130 | 30,343 | 186,427 | 216,770 |
| 1962-63 | 87.7 | 713 | 1529 | 687 | 140 | 101 | 67.9 | 49,755 | 201,094 | 250,849 |
| **Average** | **184** | **934** | **1464** | **722** | **232** | **155** | **154** | **36,038** | **232,809** | **268,847** |

**This table contains revisions to formerly reported data.**

**Natural flow records computed on the basis of Lake Sherburne storage and release records as published in the original reports to the International Joint Commission.**

TABLE 8
Page 1

## Historical Summary of Canadian Share of Natural Flow of St. Mary River at International Boundary

| Year | Mean Monthly Discharge In Cubic feet per second During Irrigation Season April - October | | | | | | | Run-off in Acre-feet | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | April | May | June | July | August | September | October | Non Irrigation Season Nov.-Mar. | Irrigation Season Apr.-Oct. | For Year Nov.-Oct. |
| 1901-02 | - | - | - | - | - | 462 d | 358 d | - | 49,474 z | 49,474 z |
| 1902-03 | 398 | 1030 | 2767 | 1618 | 869 | 721 | 622 | 28,982 | 485,718 | 514,700 |
| 1903-04 | 504 | 1178 | 1635 | 1118 | 631 | 315 | 166 | 48,181 | 336,224 | 384,405 |
| 1904-05 | 225 | 773 | 1397 | 988 | 530 | 278 | 531 | 19,564 | 289,670 | 309,234 |
| 1905-06 | 336 | 919 | 1309 | 1079 | 640 | 454 | 535 | 25,796 | 320,021 | 345,817 |
| 1906-07 | 366 | 1130 | 2296 | 1726 | 834 | 774 | 457 | 62,041 | 459,463 | 521,504 |
| 1907-08 | 542 | 1410 | 3917 | 1411 | 578 | 346 | 361 | 31,218 | 517,059 | 548,277 |
| 1908-09 | 262 | 1119 | 2752 | 1667 | 897 | 466 | 338 | 32,638 | 454,272 | 486,910 |
| 1909-10 | 757 | 1325 | 1288 | 754 | 430 | 403 | 685 | 43,864 | 342,095 | 385,959 |
| 1910-11 | 390 | 1185 | 1902 | 1006 | 694 | 857 | 452 | 48,675 | 392,503 | 441,178 |
| 1911-12 | 403 | 1382 | 1340 | 958 | 608 | 393 | 317 | 29,546 | 315,620 | 345,166 |
| 1912-13 | 506 | 1183 | 2426 | 1179 | 728 | 424 | 336 | 34,802 | 407,942 | 442,744 |
| 1913-14 | 444 | 1282 | 1316 | 882 | 522 | 430 | 587 | 29,282 | 331,543 | 360,825 |
| 1914-15 | 408 | 789 | 1292 | 1028 | 652 | 586 | 534 | 41,985 | 332,997 | 374,982 |
| 1915-16 | 497 | 1070 | 2484 | 1899 | 781 | 633 | 294 | 54,887 | 460,270 | 515,157 |
| 1916-17 | 337 | 1166 | 2219 | 1380 | 545 | 352 | 284 | 29,414 | 386,717 | 416,131 |
| 1917-18 | 450 | 1194 | 1713 | 759 | 545 | 367 | 295 | 45,628 | 317,332 | 362,960 |
| 1918-19 | 249 | 1156 | 1225 | 625 | 374 | 252 | 140 | 24,842 | 243,703 | 268,545 |
| 1919-20 | 313 | 1321 | 1733 | 1344 | 559 | 426 | 415 | 30,513 | 352,411 | 382,924 |
| 1920-21 | 466 | 1489 | 2023 | 1071 | 535 | 312 | 373 | 36,058 | 380,477 | 416,535 |
| 1921-22 | 306 | 1313 | 2085 | 956 | 472 | 315 | 226 | 32,329 | 337,446 | 369,775 |
| 1922-23 | 313 | 1310 | 1846 | 1030 | 556 | 360 | 414 | 23,595 | 353,371 | 376,966 |
| 1923-24 | 295 | 1202 | 1743 | 934 | 529 | 298 | 226 | 25,703 | 316,746 | 342,449 |
| 1924-25 | 802 | 1698 | 1923 | 1113 | 569 | 406 | 305 | 39,309 | 425,201 | 464,510 |
| 1925-26 | 444 | 799 | 706 | 568 | 304 | 537 | 731 | 24,599 | 248,057 | 272,656 |
| 1926-27 | 392 | 1509 | 2884 | 1573 | 804 | 921 | 738 | 37,419 | 534,036 | 571,455 |
| 1927-28 | 394 | 2014 | 1637 | 1464 | 625 | 383 | 581 | 56,058 | 431,645 | 487,703 |
| 1928-29 | 236 | 1085 | 1446 | 803 | 368 | 218 | 217 | 33,020 | 265,105 | 298,125 |
| 1929-30 | 306 | 1380 | 1411 | 799 | 383 | 278 | 235 | 26,187 | 326,301 | 352,488 |
| 1930-31 | 168 | 1144 | 1086 | 563 | 424 | 348 | 221 | 19,428 | 239,897 | 259,325 |
| 1931-32 | 415 | 1415 | 1615 | 872 | 444 | 230 | 180 | 41,875 | 313,367 | 355,242 |
| 1932-33 | 300 | 1049 | 2336 | 1351 | 546 | 369 | 462 | 33,744 | 382,211 | 415,955 |
| 1933-34 | 1024 | 1887 | 1631 | 744 | 401 | 242 | 201 | 84,136 | 371,274 | 455,410 |
| 1934-35 | 290 | 1087 | 1525 | 925 | 459 | 290 | 177 | 68,288 | 288,022 | 356,310 |
| 1935-36 | 426 | 1376 | 1243 | 574 | 315 | 189 | 122 | 15,002 | 257,232 | 272,234 |
| 1936-37 | 200 | 1063 | 2043 | 871 | 354 | 224 | 214 | 17,007 | 300,603 | 317,610 |
| 1937-38 | 471 | 1473 | 1828 | 978 | 380 | 270 | 241 | 32,631 | 341,754 | 374,385 |
| 1938-39 | 438 | 1302 | 1027 | 701 | 344 | 219 | 141 | 29,679 | 253,232 | 282,911 |
| 1939-40 | 285 | 1096 | 1068 | 530 | 287 | 319 | 311 | 18,908 | 236,221 | 255,129 |
| 1940-41 | 271 | 833 | 881 | 598 | 269 | 387 | 468 | 16,421 | 224,969 | 241,390 |
| 1941-42 | 461 | 1112 | 1553 | 1079 | 533 | 392 | 297 | 47,152 | 328,915 | 376,067 |
| 1942-43 | 775 | 1165 | 2028 | 1512 | 559 | 282 | 246 | 31,683 | 397,632 | 429,315 |
| 1943-44 | 148 | 798 | 984 | 555 | 400 | 318 | 280 | 18,171 | 211,297 | 229,468 |
| 1944-45 | 115 | 1158 | 1858 | 894 | 342 | 363 | 316 | 23,236 | 305,605 | 328,841 |
| 1945-46 | 446 | 1347 | 1532 | 917 | 422 | 371 | 386 | 38,408 | 328,659 | 367,067 |
| 1946-47 | 607 | 1531 | 1459 | 984 | 481 | 390 | 791 | 43,433 | 379,089 | 422,522 |
| 1947-48 | 420 | 1649 | 2910 | 955 | 535 | 247 | 200 | 35,689 | 418,054 | 453,743 |
| 1948-49 | 378 | 1335 | 1303 | 662 | 353 | 390 | 303 | 17,710 | 286,368 | 304,078 |
| 1949-50 | 346 | 1143 | 2435 | 1746 | 717 | 364 | 604 | 48,055 | 446,013 | 494,068 |
| 1950-51 | 568 | 1850 | 1882 | 1782 | 731 | 771 | 862 | 70,683 | 512,882 | 583,565 |
| 1951-52 | 621 | 1371 | 1269 | 883 | 578 | 307 | 198 | 41,416 | 317,014 | 358,430 |
| 1952-53 | 417 | 1525 | 2934 | 1426 | 606 | 328 | 212 | 31,273 | 450,712 | 481,985 |
| 1953-54 | 325 | 1775 | 1985 | 1759 | 717 | 544 | 522 | 31,309 | 463,240 | 494,549 |
| 1954-55 | 300 | 901 | 2044 | 1291 | 554 | 272 | 545 | 39,630 | 352,094 | 391,724 |
| 1955-56 | 372 | 1563 | 1982 | 1180 | 578 | 330 | 383 | 44,510 | 387,538 | 432,048 |
| 1956-57 | 205 | 1951 | 1640 | 705 | 358 | 227 | 249 | 29,681 | 324,016 | 353,697 |
| 1957-58 | 300 | 1539 | 1590 | 758 | 413 | 354 | 397 | 29,256 | 324,581 | 353,837 |
| 1958-59 | 501 | 1222 | 2195 | 1231 | 562 | 684 | 654 | 46,757 | 426,738 | 473,495 |
| 1959-60 | 496 | 858 | 1691 | 969 | 463 | 281 | 178 | 47,692 | 298,629 | 346,321 |
| 1960-61 | 311 | 1275 | 2054 | 828 | 422 | 305 | 470 | 29,251 | 343,007 | 372,258 |
| **Average** | 409 | 1271 | 1802 | 1059 | 528 | 392 | 377 | 35,903 | 353,810 | 389,713 |

This table contains revisions to formerly reported data.

Natural flow records computed on basis of Lake Sherburne storage and release records as published in the original reports to the International Joint Commission.

d - 1902 data not used.

z - Partial record not included in average.

TABLE 8
Page 1

TABLE 8
Page 2

Historical Summary
of Canadian Share of
Natural Flow of St. Mary River at International Boundary

| Mean Monthly Discharge In Cubic Feet Per Second During Irrigation Season April - October | | | | | | | | Run-off in Acre-feet | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | April | May | June | July | August | September | October | Non Irrigation Season Nov.-Mar. | Irrigation Season Apr.-Oct. | For Year Nov.-Oct. |
| 1961-62 | 522 | 1087 | 1462 | 799 | 517 | 327 | 385 | 30,343 | 308,898 | 339,241 |
| **1962-63** | **260** | **1047** | **1862** | **1021** | **415** | **304** | **204** | **49,754** | **309,560** | **359,314** |
| **Average** | **409** | **1265** | **1798** | **1054** | **526** | **389** | **374** | **36,038** | **352,349** | **388,387** |

**This table contains revisions to formerly reported data.**

**Natural flow records computed on the basis of Lake Sherburne storage and release records as published in the original reports to the International Joint Commission.**

Table 9

DETERMINATION OF THE NATURAL FLOW OF
LODGE CREEK AT INTERNATIONAL BOUNDARY

1963

Quantities in cfs - days

| Period at International Boundary | Middle Creek from Alberta Boundary | Middle Creek from Lake to Creek | Unnamed Creek below Diversions | Middle Creek Reservoir and Western Tributary Area | | Lodge Creek at Alberta Boundary | Lodge Creek below Sangler Project | Stored or Diverted at Sangler Project | Lodge Creek at International Boundary | Measured Flows below Major Projects in Canada | Natural Run-off from Project Areas in Canada | Natural Flow of Lodge Creek at International Boundary | United States | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Share | Received in Excess |
| Mar. 1 - Mar.10 | 1 | 5 | 0 | 5 | -4 | 92 | 0 | +92 | 47 | 5 | 25 | 160 | 80 | -33 |
| Mar.11 - Mar.20 | 2 | 7 | 0 | 7 | -5 | 69 | 0 | +69 | 11 | 7 | 2 | 77 | 38 | -27 |
| Mar.21 - Mar.31 | 28 | 9 | 0 | 9 | +19 | 743 | 265 | +478 | 266 | 274 | 0 | 763 | 382 | -116 |
| Apr. 1 - Apr.10 | 68 | 19 | 0 | 19 | +49 | 574 | 392 | +182 | 413 | 411 | 1 | 645 | 322 | +91 |
| Apr.11 - Apr.20 | 30 | 14 | 0 | 14 | +16 | 139 | 175 | -36 | 174 | 189 | 0 | 154 | 77 | +97 |
| Apr.21 - Apr.30 | 10 | 8 | 0 | 8 | +2 | 29 | 2 | +27 | 142 | 10 | 79 | 250 | 125 | +17 |
| May 1 - May 10 | 5 | 9 | 0 | 9 | -4 | 2 | 0 | +2 | 14 | 9 | 3 | 15 | 8 | +6 |
| May 11 - May 20 | 6 | 12 | 0 | 12 | -6 | 1 | 0 | +1 | 4 | 12 | 0 | 0 | 0 | +4 |
| May 21 - May 31 | 4 | 9 | 0 | 9 | -5 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 |
| June 1 - June 10 | 2 | 9 | 0 | 9 | -7 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 |
| June 11 - June 20 | 1 | 6 | 0 | 6 | -5 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| June 21 - June 30 | 1 | 6 | 0 | 6 | -5 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| July 1 - July 10 | 217 | 138 | 1 | 139 | +78 | 2,604 | 295 | +2,309 | 779 | 433 | 208 | 3,374 | 1,687 | -908 |
| July 11 - July 20 | 14 | 6 | 6 | 12 | +2 | 77 | 166 | -89 | 301 | 172 | 77 | 291 | 145 | +156 |
| July 21 - July 31 | 4 | 5 | 2 | 7 | -3 | 5 | 793 | -788 | 809 | 798 | 7 | 25 | 13 | +796 |
| Aug. 1 - Aug.10 | 4 | 4 | 0 | 4 | 0 | 0 | 137 | -137 | 104 | 141 | 0 | 0 | 0 | +104 |
| Aug. 11 - Aug.20 | 3 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| Aug. 21 - Aug.31 | 4 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| Sept. 1 - Sept.10 | 2 | 4 | 0 | 4 | -2 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| Sept. 11 - Sept.20 | 2 | 6 | 0 | 6 | -4 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| Sept. 21 - Sept.30 | 2 | 6 | 0 | 6 | -4 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| Oct. 1 - Oct.10 | 2 | 7 | 0 | 7 | -5 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 |
| Oct.11 - Oct.20 | 2 | 7 | 0 | 7 | -5 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 |
| Oct.21 - Oct.31 | 2 | 9 | 0 | 9 | -7 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 |
| Total | 416 | 312 | 9 | 321 | +95 | 4,335 | 2,225 | +2,110 | 3,064 | 2,537 | +402 | 5,754 | 2,877 | +187 |
| Accumulated | 825 | 619 | 18 | 637 | +188 | 8,598 | 4,413 | +4,185 | 6,077 | 5,032 | 797 | 11,413 | 5,706 | +371 |

Table 10
Page 1

# DETERMINATION OF NATURAL FLOW OF BATTLE CREEK AT INTERNATIONAL BOUNDARY 1963

Quantities in cfs-days

| Period at International Boundary | Reesor Lake | | Adams Lake | | Total Change in Contents Reesor Lake and Adams Lake | | Adjustment for Channel Losses to International Boundary computed | Net Depletion at Reesor Lake and Adams Lake | |
|---|---|---|---|---|---|---|---|---|---|
| | Stored | Released | Stored | Released | Stored | Released | | Stored | Released |
| Feb.23 - Mar. 4 | 7 | | 2 | | 9 | | + 9 | 0 | |
| Mar. 5 - Mar.14 | 0 | | 3 | | 3 | | + 3 | 0 | |
| Mar.15 - Mar.25 | 6 | | 4 | | 10 | | + 10 | 0 | |
| Mar.26 - Apr. 4 | 32 | | 10 | | 42 | | + 42 | 0 | |
| Apr. 5 - Apr.14 | 29 | | 164 | | 193 | | + 60 | 133 | |
| Apr.15 - Apr.24 | | 10 | 14 | | 4 | | + 4 | 0 | |
| Apr.25 - May 4 | 12 | | 4 | | 16 | | + 16 | 0 | |
| May 5 - May 14 | 5 | | | 89 | | 84 | - 60 | | 24 |
| May 15 - May 25 | | 2 | | 97 | | 99 | - 66 | | 33 |
| May 26 - June 4 | | 13 | | 1 | | 14 | - 14 | 0 | |
| June 5 -June 14 | | 8 | 10 | | 2 | | + 2 | 0 | |
| June 15-June 24 | | 6 | | 1 | | 7 | - 7 | 0 | |
| June 25-July 4 | 1 | | 1 | | 2 | | + 2 | 0 | |
| July 5-July 14 | | 10 | 2 | | | 8 | - 8 | 0 | |
| July 15-July 25 | | 12 | | 1 | | 13 | - 13 | 0 | |
| July 26-Aug. 4 | | 15 | 0 | | | 15 | - 15 | 0 | |
| Aug. 5 - Aug.14 | | 5 | 0 | | | 5 | - 5 | 0 | |
| Aug.15 - Aug.25 | 7 | | 0 | | 7 | | + 7 | 0 | |
| Aug.26 - Sept.4 | 0 | | | 1 | | 1 | - 1 | 0 | |
| Sept. 5-Sept.14 | 6 | | | 1 | 5 | | + 5 | 0 | |
| Sept.15-Sept.24 | 4 | | | 2 | 2 | | + 2 | 0 | |
| Sept.25- Oct. 4 | 5 | | | 1 | 4 | | + 4 | 0 | |
| Oct. 5 - Oct.14 | | 1 | | 1 | | 2 | - 2 | 0 | |
| Oct.15 - Oct.25 | | 1 | | 1 | | 2 | - 2 | 0 | |
| Oct.26 - Oct.31 | | 4 | | 1 | | 5 | - 5 | 0 | |
| Total | 114 | 87 | 214 | 197 | 299 | 255 | - 32 | 133 | 57 |
| Acre-feet | 226 | 173 | 424 | 391 | 593 | 506 | - 63 | 264 | 113 |

Table 10
Page 2

DETERMINATION OF NATURAL FLOW OF BATTLE CREEK
AT INTERNATIONAL BOUNDARY
1963

Diversion to Cypress Lake
Quantities in cfs - days

| Period at International Boundary | West Inflow Canal | West Inflow Canal Drain | Diversion to Cypress Lake | West Outflow Canal | Net Diversion to Cypress Lake |
|---|---|---|---|---|---|
| Feb.23 - Mar. 4 | 0 | 0 | 0 | 0 | 0 |
| Mar. 5 - Mar.14 | 0 | 0 | 0 | 0 | 0 |
| Mar.15 - Mar.25 | 0 | 0 | 0 | 1 | -1 |
| Mar.26 - Apr. 4 | 384 | 34 | 350 | 12 | 338 |
| Apr. 5 - Apr.14 | 135 | 2 | 133 | 11 | 122 |
| Apr.15 - Apr.24 | 9 | 1 | 8 | 73 | -65 |
| Apr.25 - May 4 | 1 | 1 | 0 | 356 | -356 |
| May 5 - May 14 | 4 | 1 | 3 | 511 | -508 |
| May 15 - May 25 | 7 | 1 | 6 | 614 | -608 |
| May 26 - June 4 | 0 | 0 | 0 | 381 | -381 |
| June 5 - June 14 | 0 | 0 | 0 | 282 | -282 |
| June 15-June 24 | 0 | 0 | 0 | 42 | -42 |
| June 25-July 4 | 3 | 1 | 2 | 20 | -18 |
| July 5-July 14 | 430 | 3 | 427 | 50 | 377 |
| July 15-July 25 | 70 | 2 | 68 | 0 | 68 |
| July 26-Aug. 4 | 9 | 0 | 9 | 0 | 9 |
| Aug. 5 - Aug.14 | 3 | 0 | 3 | 0 | 3 |
| Aug.15 - Aug.25 | 0 | 0 | 0 | 0 | 0 |
| Aug.26 - Sept.4 | 0 | 1 | -1 | 3 | -4 |
| Sept. 5-Sept.14 | 0 | 0 | 0 | 0 | 0 |
| Sept.15-Sept.24 | 0 | 0 | 0 | 0 | 0 |
| Sept.25- Oct. 4 | 0 | 0 | 0 | 0 | 0 |
| Oct. 5 - Oct.14 | 0 | 0 | 0 | 0 | 0 |
| Oct.15 - Oct.25 | 0 | 0 | 0 | 0 | 0 |
| Oct.26 - Oct.31 | 0 | 0 | 0 | 0 | 0 |
| Total | 1,055 | 47 | 1,008 | 2,356 | -1,348 |
| Acre-feet | 2,093 | 93 | 1,999 | 4,673 | -2,674 |

DETERMINATION OF NATURAL FLOW OF BATTLE CREEK
AT INTERNATIONAL BOUNDARY
1963

Diversion to Irrigated Lands
Quantities in cfs - days

| Period at International Boundary | Stirling & Nash Ditch | McKinner Ditch | Richardson Ditch | Vicary Ditch | Total Diverted | Return Flow | Net Diversion to Irrigated Land |
|---|---|---|---|---|---|---|---|
| Feb.23 - Mar. 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mar. 5 - Mar.14 | 40 | 0 | 0 | 0 | 40 | 8 | 32 |
| Mar.15 - Mar.25 | 163 | 0 | 0 | 0 | 163 | 33 | 130 |
| Mar.26 - Apr. 4 | 160 | 0 | 0 | 0 | 160 | 32 | 128 |
| Apr. 5 - Apr.14 | 258 | 46 | 0 | 0 | 304 | 61 | 243 |
| Apr.15 - Apr.24 | 154 | 0 | 0 | 0 | 154 | 31 | 123 |
| Apr.25 - May 4 | 0 | 29 | 7 | 0 | 36 | 7 | 29 |
| May 5 - May 14 | 0 | 168 | 260 | 145 | 573 | 115 | 458 |
| May 15 - May 25 | 0 | 219 | 262 | 349 | 830 | 166 | 664 |
| May 26 - June 4 | 122 | 184 | 166 | 26 | 498 | 100 | 398 |
| June 5 - June 14 | 0 | 30 | 3 | 252 | 285 | 57 | 228 |
| June 15 - June 24 | 0 | 2 | 0 | 43 | 45 | 9 | 36 |
| June 25 - July 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| July 5 - July 14 | 67 | 0 | 0 | 0 | 67 | 13 | 54 |
| July 15 - July 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| July 26 - Aug. 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aug. 5 - Aug.14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aug.15 - Aug.25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aug.26 - Sept.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sept. 5 - Sept.14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sept.15 - Sept.24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sept.25 - Oct. 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct. 5 - Oct.14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct.15 - Oct.25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct.26 - Oct.31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 964 | 678 | 698 | 815 | 3,155 | 632 | 2,523 |
| Acre-feet | 1,912 | 1,345 | 1,384 | 1,617 | 6,258 | 1,254 | 5,004 |

Table 10
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DETERMINATION OF NATURAL FLOW OF BATTLE CREEK
AT INTERNATIONAL BOUNDARY

1963

Quantities in cfs-days

| Period at International Boundary | Net Depletion in Canada | Battle Creek at International Boundary | Apparent Natural Flow of Battle Creek at International Boundary | Adjustment for Minor Diversions in Canada | Net Depletion at Reesor Lake and Adams Lake | Battle Creek at International Boundary | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Natural Flow | United States Share | Received in Excess |
| Feb.23 - Mar. 4 | 0 | 84 | 84 | 10 | 0 | 94 | 47 | +37 |
| Mar. 5 - Mar.14 | 32 | 12 | 44 | 5 | 0 | 49 | 24 | -12 |
| Mar.15 - Mar.25 | 129 | 46 | 175 | 21 | 0 | 196 | 98 | -52 |
| Mar.26 - Apr. 4 | 466 | 310 | 776 | 94 | 0 | 870 | 435 | -125 |
| Apr. 5 - Apr.14 | 365 | 370 | 735 | 90 | +133 | 958 | 479 | -109 |
| Apr.15 - Apr.24 | 58 | 179 | 237 | 29 | 0 | 266 | 133 | +46 |
| Apr.25 - May 4 | -327 | 444 | 117 | 14 | 0 | 131 | 66 | +378 |
| May 5 - May 14 | -50 | 113 | 63 | 8 | -24 | 47 | 24 | +89 |
| May 15 - May 25 | 56 | 42 | 98 | 12 | -33 | 77 | 38 | +4 |
| May 26 - June 4 | 17 | 1 | 18 | 2 | 0 | 20 | 10 | -9 |
| June 5 -June 14 | -54 | 158 | 104 | 13 | 0 | 117 | 58 | +100 |
| June 15-June 24 | -6 | 68 | 62 | 8 | 0 | 70 | 35 | +33 |
| June 25-July 4 | -18 | 52 | 34 | 4 | 0 | 38 | 19 | +33 |
| July 5-July 14 | 431 | 413 | 844 | 103 | 0 | 947 | 474 | -61 |
| July 15-July 25 | 68 | 69 | 137 | 17 | 0 | 154 | 77 | -8 |
| July 26-Aug. 4 | 9 | 7 | 16 | 2 | 0 | 18 | 9 | -2 |
| Aug. 5 - Aug.14 | 3 | 0 | 3 | 0 | 0 | 3 | 2 | -2 |
| Aug.15 - Aug.25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aug.26 - Sept.4 | -4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sept. 5-Sept.14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sept.15-Sept.24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sept.25- Oct. 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct. 5 - Oct.14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct.15 - Oct.25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct.26 - Oct.31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 1,175 | 2,368 | 3,547 | 432 | +76 | 4,055 | 2,028 | 340 |
| Acre-feet | 2,331 | 4,697 | 7,035 | 857 | +151 | 8,043 | 4,022 | 674 |

DETERMINATION OF NATURAL FLOW OF
FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY
1963

Table 11
Page 1

Cypress Lake Storage and Diversion
Quantities in cfs - days

| Period at International Boundary | Belanger Creek Diversion to Cypress Lake | Cypress Lake East Outflow Canal | Net Belanger Creek Diversion | Cypress Lake Natural Overflow | Gross Depletion at Cypress Lake | Adjustment for Channel Losses to International Boundary | Net Depletion at Cypress Lake |
|---|---|---|---|---|---|---|---|
| | | | | computed | | computed | |
| Mar. 1 - 10 | 0 | 10 | - 10 | 0 | - 10 | - 10 | 0 |
| Mar. 11 - 20 | 0 | 10 | - 10 | 0 | - 10 | - 10 | 0 |
| Mar. 21 - 31 | 0 | 12 | - 12 | 0 | - 12 | - 12 | 0 |
| Apr. 1 - 10 | 1,204 | 20 | +1,184 | 0 | +1,184 | + 195 | + 989 |
| Apr. 11 - 20 | 380 | 15 | + 365 | 0 | + 365 | + 115 | + 250 |
| Apr. 21 - 30 | 240 | 12 | + 228 | 0 | + 228 | + 90 | + 138 |
| May 1 - 10 | 117 | 10 | + 107 | 0 | + 107 | + 68 | + 39 |
| May 11 - 20 | 96 | 6 | + 90 | 0 | + 90 | + 69 | + 21 |
| May 21 - 31 | 85 | 6 | + 79 | 0 | + 79 | + 70 | + 9 |
| June 1- 10 | 59 | 4 | + 55 | 0 | + 55 | + 55 | 0 |
| June 11- 20 | 73 | 5 | + 68 | 0 | + 68 | + 64 | + 4 |
| June 21- 30 | 21 | 2 | + 19 | 0 | + 19 | + 19 | 0 |
| July 1- 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| July 11- 20 | 9 | 3 | + 6 | 0 | + 6 | + 6 | 0 |
| July 21- 31 | 0 | 1 | - 1 | 0 | - 1 | - 1 | 0 |
| Aug. 1- 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aug. 11- 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aug. 21- 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sept. 1- 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sept. 11- 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sept. 21- 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct. 1- 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct. 11- 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct. 21- 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 2,284 | 116 | +2,168 | 0 | +2,168 | + 718 | +1,450 |
| Acre-feet | 4,530 | 230 | +4,300 | 0 | +4,300 | +1,424 | +2,876 |

DETERMINATION OF NATURAL FLOW OF
FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY
1963

East End Reservoir Storage and Diversion
Quantities in cfs - days

| Period at International Boundary | East End Reservoir | | East End Canal | Return Flow from East End District | Gross Depletion at East End | Adjustment for Channel Losses to International Boundary | Net Depletion at East End |
|---|---|---|---|---|---|---|---|
| | Stored | Released | | computed | | computed | |
| Mar. 1 - 10 | 1 | | 0 | 0 | + 1 | + 1 | 0 |
| Mar. 11 - 20 | 0 | | 0 | 0 | 0 | 0 | 0 |
| Mar. 21 - 31 | 18 | | 0 | 0 | + 18 | + 18 | 0 |
| Apr. 1 - 10 | 613 | | 0 | 0 | + 613 | + 106 | + 507 |
| Apr. 11 - 20 | 292 | | 4 | 1 | + 295 | + 87 | + 208 |
| Apr. 21 - 30 | 25 | | 151 | 30 | + 146 | + 64 | + 82 |
| May 1 - 10 | 12 | | 104 | 21 | + 95 | + 57 | + 38 |
| May 11 - 20 | 8 | | 174 | 35 | + 147 | + 74 | + 73 |
| May 21 - 31 | | 30 | 201 | 40 | + 131 | + 74 | + 57 |
| June 1- 10 | | 233 | 381 | 76 | + 72 | + 56 | + 16 |
| June 11- 20 | 246 | | 87 | 17 | + 316 | + 156 | + 160 |
| June 21- 30 | 68 | | 1 | 0 | + 69 | + 58 | + 11 |
| July 1- 10 | 45 | | 1 | 0 | + 46 | + 46 | 0 |
| July 11- 20 | | 25 | 1 | 0 | - 24 | - 24 | 0 |
| July 21- 31 | | 46 | 80 | 16 | + 18 | + 18 | 0 |
| Aug. 1- 10 | | 279 | 394 | 79 | + 36 | + 36 | 0 |
| Aug. 11- 20 | | 248 | 328 | 66 | + 14 | + 14 | 0 |
| Aug. 21- 31 | | 215 | 279 | 56 | + 8 | + 8 | 0 |
| Sept. 1- 10 | | 66 | 107 | 22 | + 19 | + 19 | 0 |
| Sept. 11- 20 | 0 | | 0 | 0 | 0 | 0 | 0 |
| Sept. 21- 30 | 0 | | 0 | 0 | 0 | 0 | 0 |
| Oct. 1- 10 | 0 | | 0 | 0 | 0 | 0 | 0 |
| Oct. 11- 20 | 0 | | 0 | 0 | 0 | 0 | 0 |
| Oct. 21- 31 | 2 | | 0 | 0 | + 2 | + 2 | 0 |
| Total | 1,330 | 1,142 | 2,293 | 459 | +2,022 | + 870 | +1,152 |
| Acre-feet | 2,638 | 2,265 | 4,548 | 910 | +4,011 | +1,726 | +2,285 |

DETERMINATION OF NATURAL FLOW OF
FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY
1963

Val Marie Storage
Quantities in cfs - days

| Period at International Boundary | Val Marie West Reservoir | | Val Marie Reservoir | | Total Change in Reservoir Contents at Val Marie | |
|---|---|---|---|---|---|---|
| | Stored | Released | Stored | Released | Stored | Released |
| Mar. 1 - 10 | 457 | | | 38* | 419 | |
| Mar. 11 - 20 | | 343 | 1,109 | | 766 | |
| Mar. 21 - 31 | 432 | | 504 | | 936 | |
| Apr. 1 - 10 | 161 | | | 387 | | 226 |
| Apr. 11 - 20 | 7 | | 610 | | 617 | |
| Apr. 21 - 30 | | 5 | | 408 | | 413 |
| May 1 - 10 | 11 | | 193 | | 204 | |
| May 11 - 20 | | 8 | 249 | | 241 | |
| May 21 - 31 | | 144 | | 541 | | 685 |
| June 1 - 10 | | 48 | 347 | | 299 | |
| June 11 - 20 | 265 | | | 162 | 103 | |
| June 21 - 30 | | 84 | | 663 | | 747 |
| July 1 - 10 | 147 | | | 356 | | 209 |
| July 11 - 20 | 8 | | 118* | | 126 | |
| July 21 - 31 | | 290 | | 570 | | 860 |
| Aug. 1 - 10 | | 526 | | 455 | | 981 |
| Aug. 11 - 20 | | 358* | | 175 | | 533 |
| Aug. 21 - 31 | | 181 | | 138* | | 319 |
| Sept. 1 - 10 | | 49 | | 55 | | 104 |
| Sept. 11 - 20 | 5 | | | 41 | | 36 |
| Sept. 21 - 30 | | 159 | 135 | | | 24 |
| Oct. 1 - 10 | | 143 | 101 | | | 42 |
| Oct. 11 - 20 | | 19 | 12 | | | 7 |
| Oct. 21 - 31 | 13 | | | 17 | | 4 |
| Total | 1,506 | 2,357 | 3,378* | 4,006 | 3,711 | 5,190 |
| Acre-feet | 2,987 | 4,675 | 6,700 | 7,946 | 7,361 | 10,294 |

DETERMINATION OF NATURAL FLOW OF
FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY
1963

Diversion to Irrigated Lands
Quantities in cfs - days

| Period at International Boundary | Val Marie West Gravity Canal | Val Marie West Pumping Canal | Val Marie Main Canal | Electric Pumps | Total Canal Diversion at Val Marie | Return Flow from Val Marie Projects computed | Gross Depletion at Val Marie | Adjustment for Channel Losses to International Boundary computed | Net Depletion at Val Marie |
|---|---|---|---|---|---|---|---|---|---|
| Mar. 1 - 10 | 0 | 0 | 0 | 0 | 0 | 0 | + 419 | + 36 | + 383 |
| Mar. 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | + 766 | + 50 | + 716 |
| Mar. 21 - 31 | 0 | 0 | 0 | 0 | 0 | 0 | + 936 | + 59 | + 877 |
| Apr. 1 - 10 | 0 | 0 | 0 | 0 | 0 | 0 | - 226 | - 32 | - 194 |
| Apr. 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | + 617 | + 56 | + 561 |
| Apr. 21 - 30 | 0 | 0 | 0 | 0 | 0 | 0 | - 413 | - 44 | - 369 |
| May 1 - 10 | 0 | 0 | 0 | 0 | 0 | 0 | + 204 | + 38 | + 166 |
| May 11 - 20 | 1 | 0 | 0 | 0 | 1 | 0 | + 242 | + 42 | + 200 |
| May 21 - 31 | 82 | 45 | 0 | 18 | 145 | 29 | - 569 | - 77 | - 492 |
| June 1 - 10 | 270 | 164 | 491 | 29 | 954 | 191 | + 1,062 | + 187 | + 875 |
| June 11 - 20 | 0 | 0 | 526 | 25 | 551 | 110 | + 544 | + 104 | + 440 |
| June 21 - 30 | 57 | 14 | 584 | 1 | 656 | 131 | - 222 | - 52 | - 170 |
| July 1 - 10 | 88 | 10 | 346 | 0 | 444 | 89 | + 146 | + 40 | + 106 |
| July 11 - 20 | 0 | 0 | 213 | 1 | 214 | 43 | + 297 | + 64 | + 233 |
| July 21 - 31 | 81 | 148 | 468 | 42 | 739 | 148 | - 269 | - 62 | - 207 |
| Aug. 1 - 10 | 260 | 230 | 457 | 43 | 990 | 198 | - 189 | - 47 | - 142 |
| Aug. 11 - 20 | 159 | 207 | 250 | 30 | 646 | 129 | - 16 | - 16 | 0 |
| Aug. 21 - 31 | 40 | 170 | 155 | 12 | 377 | 76 | - 18 | - 18 | 0 |
| Sept. 1 - 10 | 0 | 68 | 7 | 11 | 86 | 17 | - 35 | - 22 | - 13 |
| Sept. 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | - 36 | - 22 | - 14 |
| Sept. 21 - 30 | 0 | 0 | 0 | 0 | 0 | 0 | - 24 | - 20 | - 4 |
| Oct. 1 - 10 | 0 | 0 | 0 | 0 | 0 | 0 | - 42 | - 21 | - 21 |
| Oct. 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | - 7 | - 7 | 0 |
| Oct. 21 - 31 | 0 | 0 | 0 | 0 | 0 | 0 | - 4 | - 4 | 0 |
| Total | 1,038 | 1,056 | 3,497 | 212 | 5,803 | 1,161 | + 3,163 | 232 | 2,931 |
| Acre-feet | 2,059 | 2,095 | 6,936 | 420 | 11,510 | 2,303 | + 6,274 | 460 | 5,814 |

DETERMINATION OF NATURAL FLOW OF
FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY
1963

Quantities in cfs-days

| Period at International Boundary | Net Depletion in Canada | Frenchman River at International Boundary | Apparent Natural Flow of Frenchman River at International Boundary | Adjustment for Minor Diversions in Canada | Frenchman River at International Boundary | | |
|---|---|---|---|---|---|---|---|
| | | | | | Natural Flow | United States Share | Received in Excess |
| | | | | computed | | | |
| Mar. 1 - 10 | + 383 | 1,464 | 1,847 | 78 | 1,925 | 962 | + 502 |
| Mar. 11 - 20 | + 716 | 679 | 1,395 | 59 | 1,454 | 727 | - 48 |
| Mar. 21 - 31 | + 877 | 3,748 | 4,625 | 195 | 4,820 | 2,410 | + 1,338 |
| Apr. 1 - 10 | + 1,302 | 3,114 | 4,416 | 186 | 4,602 | 2,301 | + 813 |
| Apr. 11 - 20 | + 1,019 | 656 | 1,675 | 71 | 1,746 | 873 | - 217 |
| Apr. 21 - 30 | - 149 | 959 | 810 | 34 | 844 | 422 | + 537 |
| May 1 - 10 | + 243 | 217 | 460 | 19 | 479 | 240 | - 23 |
| May 11 - 20 | + 294 | 220 | 514 | 22 | 536 | 268 | - 48 |
| May 21 - 31 | - 426 | 560 | 134 | 6 | 140 | 70 | + 490 |
| June 1 - 10 | + 891 | 1,667 | 2,558 | 108 | 2,666 | 1,333 | + 334 |
| June 11 - 20 | + 604 | 927 | 1,531 | 65 | 1,596 | 798 | + 129 |
| June 21 - 30 | - 159 | 582 | 423 | 18 | 441 | 220 | + 362 |
| July 1 - 10 | + 106 | 550 | 656 | 28 | 684 | 342 | + 208 |
| July 11 - 20 | + 233 | 312 | 545 | 23 | 568 | 284 | + 28 |
| July 21 - 31 | - 207 | 549 | 342 | 14 | 356 | 178 | + 371 |
| Aug. 1 - 10 | - 142 | 282 | 140 | 6 | 146 | 73 | + 209 |
| Aug. 11 - 20 | 0 | 155 | 155 | 7 | 162 | 81 | + 74 |
| Aug. 21 - 31 | 0 | 239 | 239 | 10 | 249 | 125 | + 114 |
| Sept. 1 - 10 | - 13 | 165 | 152 | 6 | 158 | 79 | + 86 |
| Sept. 11 - 20 | - 14 | 6 | 0 | 0 | 0 | 0 | + 6 |
| Sept. 21 - 30 | - 4 | 8 | 4 | 0 | 4 | 2 | + 6 |
| Oct. 1 - 10 | - 21 | 1 | 0 | 0 | 0 | 0 | + 1 |
| Oct. 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct. 21 - 31 | 0 | 20 | 20 | 1 | 21 | 10 | + 10 |
| Total | + 5,533 | 17,080 | 22,641 | 956 | 23,597 | 11,798 | + 5,282 |
| Acre-feet | +10,975 | 33,878 | 44,908 | 1,896 | 46,804 | 23,401 | +10,477 |

# GAUGING STATIONS OPERATED JOINTLY BY CANADA AND UNITED STATES IN ST. MARY AND MILK RIVER DRAINAGE BASINS

- 1963 -

| Map Index | Stream and Location | Remarks |
|---|---|---|
| | **St. Mary River Basin** | |
| 5AE-27 | St. Mary River at International Boundary | Int.[a] |
| 5AE-0.5 | Swiftcurrent Creek at Many Glacier, Montana | Int.[a] |
| 5AE-0.9 | Lake Sherburne at Sherburne, Montana | Int.R[a] |
| 5AE-0.6 | Swiftcurrent Creek at Sherburne, Montana | Int.[a] |
| 5AE-0.2 | St. Mary Canal at St. Mary Crossing, near Babb, Montana | Int.[a] |
| 5AE-0.3 | St. Mary Canal at Hudson Bay Divide, near Browning, Mont. | Int.[a] |
| | **Milk River Basin** | |
| 11AA-0.4 | South Fork Milk River near Babb, Montana | Int.[a] |
| 11AA-25 | Milk River at Western Crossing of International Boundary | Int.[a] |
| 11AA-5 | Milk River at Milk River | Int.[a] |
| 11AA-0.2 | Milk River at Eastern Crossing of International Boundary | Int.[a] |
| 11AA-0.3 | North Fork Milk River above St. Mary Canal, near Browning, Montana | Int.[a] |
| 11AA-1 | North Milk River near International Boundary | Int.[a] |
| | **Lodge Creek Tributary Basin** | |
| 11AB-82 | Lodge Creek at Alberta Boundary | Int.[a] |
| 11AB-88 | Lodge Creek below Spangler Project | Int.[a] |
| 11AB-83 | Lodge Creek below McRae Creek at International Boundary (formerly below McRae Coulee at International Boundary) | Int.[a] |
| 11AB-86 | Walburger Coulee below Diversions | Int.[a] |
| 11AB-9 | Middle Creek near Alberta Boundary | Int.[a] |
| 11AB-87 | Middle Creek near Battle Creek | Int.[a] |
| 11AB-8 | Middle Creek above Lodge Creek | Int.[a] |

| Map Index | Stream and Location | Remarks |
|---|---|---|
| | **Battle Creek Tributary Basin** | |
| 11AB-76 | Battle Creek above Cypress Lake West Inflow Canal | Int.[a] |
| 11AB-27 | Battle Creek at International Boundary | Int.[a] |
| 11AB-78 | Cypress Lake West Inflow Canal | Int.[a] |
| 11AB-85 | Cypress Lake West Inflow Canal Drain | Int.[a] |
| 11AB-77 | Cypress Lake West Outflow Canal | Int.[a] |
| 11AB-84 | Vidora Ditch near Consul | Int.[a] |
| 11AB-58 | Richardson Ditch near Consul | Int.[a] |
| 11AB-44 | McKinnon Ditch near Consul | Int.[a] |
| 11AB-18 | Stirling and Nash Ditch near Consul | Int.[a] |
| 11AB-0.1 | Woodpile Coulee near International Boundary | Int.[a] |
| 11AB-0.3 | East Fork Battle Creek near International Boundary | Int.[a] |
| 11AB-75 | Lyons Creek at International Boundary (formerly Lyons Coulee at International Boundary) | Int.[a] |
| | **Whitewater Creek Tributary Basin** | |
| 11AD-0.1 | Whitewater Creek near International boundary | Int.[a] |
| | **Frenchman River Tributary Basin** | |
| 11AC-18 | Frenchman River above Eastend Reservoir | Int.[a] |
| 11AC-55 | Eastend Reservoir | Int.R[a] |
| 11AC-1 | Frenchman River below Eastend Reservoir | Int.[a] |
| 11AC-57 | Frenchman River below Eastend Irrigation Project | Int.[a] |
| 11AC-63 | Val Marie West Reservoir | Int.R[a] |
| 11AC-56 | Val Marie Reservoir | Int.R[a] |
| 11AC-51 | Frenchman River below Val Marie | Int.R[a] |
| 11AC-41 | Frenchman River at International boundary | Int.[a] |

| Map Index | Stream and Location | Remarks |
|---|---|---|
| | **Frenchman River Tributary Basin** | |
| 11AC-60 | Cypress Lake East Outflow Canal | Int.[a] |
| 11AC-37 | Cypress Lake | Int.R[a] |
| 11AC-64 | Belanger Creek Diversion to Cypress Lake | Int.[a] |
| 11AC-52 | Eastend Canal | Int.[a] |
| 11AC-66 | Val Marie West Pumping Canal | Int.[a] |
| 11AC-65 | Val Marie West Gravity Canal | Int.[a] |
| 11AC-54 | Val Marie Main Canal | Int.[a] |
| 11AC-25 | Denniel Creek near Val Marie | Int.[a] |
| | **Rock Creek Tributary Basin** | |
| 11AE-0.6 | Rock Creek below Horse Creek near International Boundary | Int.[a] |
| 11AE-0.4 | McEachern Creek at International Boundary | Int.[a] |

GAUGING STATIONS OPERATED INDEPENDENTLY
BY CANADA OR UNITED STATES
IN ST. MARY AND MILK RIVER DRAINAGE BASINS

- 1963 -

| Map Index | Stream and Location | Remarks |
|---|---|---|
| | St. Mary River Basin | |
| 175 | St. Mary River near Babb, Montana | U.S.[c] |
| 5AE-25 | St. Mary Reservoir near Spring Coulee | Canada R[a] |
| 5AE-6 | St. Mary River near Lethbridge | Canada[c] |
| 139 | Grinnell Creek at Grinnell Glacier near Many Glacier, Montana | U.S.[c] |
| 140 | Grinnell Creek near Many Glacier, Montana | U.S.[c] |
| 5AE-5 | Rolph Creek near Kimball | Canada[a] |
| 5AE-2 | Lee Creek at Cardston | Canada[a] |
| 5AE-26 | Canadian St. Mary Canal near Spring Coulee | Canada[a] |
| 5AE-21 | Magrath Irrigation District Canal near Spring Coulee | Canada[a] |
| | Lodge Creek Tributary Basin | |
| 11AB-89 | Altawan Reservoir near Govenlock | Canada R[a] |
| 11AB-60 | Spangler Ditch near Govenlock | Canada[a] |
| 11AB-80 | Middle Creek Reservoir | Canada R[a] |
| 1460 | North Chinook Canal near Havre, Montana | U.S.[b] |
| | Battle Creek Tributary Basin | |
| 11AB-81 | Battle Creek at Ranger Station | Canada[c] |
| 11AB-90 | Reesor Reservoir | Canada R[a] |
| 11AB-95 | Adams Lake | Canada R[a] |
| 1525 | Matheson Canal near Chinook, Montana | U.S.[b] |

| Map Index | Stream and Location | Remarks |
|---|---|---|
| | **Frenchman River Tributary Basin** | |
| 1645 | Frenchman Canal near Saco, Montana | U.S.[b] |

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Int. - International Gauging Station.

Int.R - International Station on Reservoir.

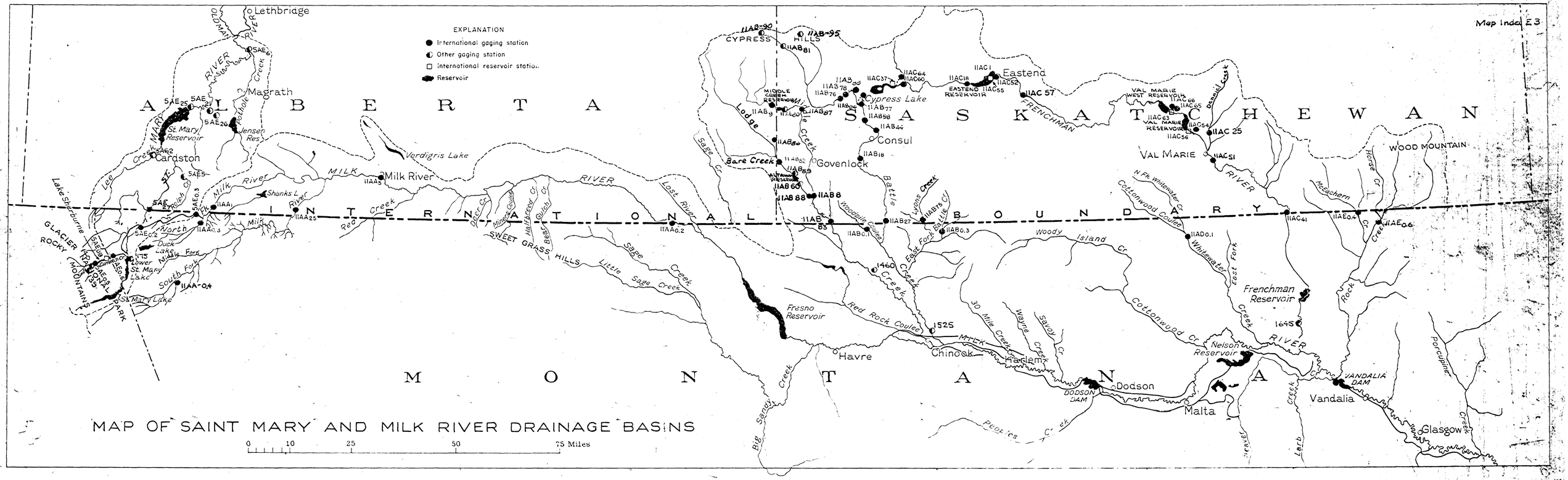
U.S. - Denotes operation by United States Geological Survey.

Canada - Denotes operation by Water Resources Branch, Canada.

a - Monthly and daily discharge data and stream measurements contained in Appendix B.

b - Monthly Discharge data only tabulated in this report.

c - Data not included in this report or appendix.



MAP OF SAINT MARY AND MILK RIVER DRAINAGE BASINS

Report to the International Joint Commission on the division and use of the waters of the St. Mary and Milk Rivers...

| DATE DUE | BORROWER'S NAME |
| --- | --- |
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1963

Report to the International Joint Commission on the division and use of the waters of the St. Mary and Milk Rivers...